



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>

*Theories and Facts
For Students of
Longevity and Health*

Thomas Bersford

24503292596



LANE MEDICAL LIBRARY STANFORD
F85 .B53 1908
Theories and facts for students of longe
STOR

\$1.00 net

JAN 27 1886



Gift
Adolph E. Schmidt, M.D.

LANE MEDICAL LIBRARY OF
STANFORD UNIVERSITY
300 PASTEUR
PALO ALTO, CALIFORNIA

JAN 27 1946



Gift
Adolph E. Schmidt, M.D.

LANE MEDICAL LIBRARY OF
STANFORD UNIVERSITY
300 PASTOR
PALO ALTO, CALIFORNIA

LANE MEDICAL LIBRARY OF
STANFORD UNIVERSITY
300 PASTEUR
PALO ALTO, CALIFORNIA



**Theories and Facts for Stu-
dents of Longevity
and Health**

By Thomas Bersford.

PROBLEMS OF PSYCHOLOGY AND PHILOSOPHY	\$1.00
USEFUL PRINCIPLES OF LOGIC.....	.50
THEORIES AND FACTS.....	1.00
PHILOSOPHY OF HAPPINESS.....	.50
ESSAY ON MORAL TRAINING IN PUBLIC SCHOOLS10
HELL-MAKERS AND SOCIAL PESTS.....	.10
TACTICS AND STRATEGY.....	.50
POCKET BOOK OF STATISTICS.....	.25

Special terms to dealers and agents.

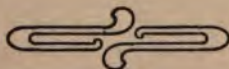
Address: SAN FRANCISCO, CALIF.

THEORIES *and* FACTS

FOR STUDENTS OF
LONGEVITY
and HEALTH

By THOMAS BERSFORD

PRESIDENT AMERICAN HYGIENIC SOCIETY, EDITOR OF THE
HYGIENIC JOURNAL. LATE INDUSTRIAL INSPECTOR FOR S. F.
BOARD OF HEALTH. AUTHOR OF "PROBLEMS OF PSYCHOLOGY
AND PHILOSOPHY," "USEFUL PRINCIPLES OF LOGIC," ETC.



San Francisco, California



Published by Thomas Bersford

Copyright 1908
by
THOMAS BRESFORD
Copyright applied for in Great Britain and Canada.

00
153
908

SYNOPSIS OF CONTENTS

ALPHABETICAL INDEX

THE PHENOMENA OR CHARACTERISTICS OF PHYSICAL DECAY,
AND DISEASES OF OLD AGE

THEORIES REGARDING THE CAUSE AND PREVENTION OF
CALCAREOUS DEPOSITS

THE DISTILLED-WATER THEORY

THE OLIVE OIL THEORY

THE METCHNIKOFF THEORY

THE GUBLER THEORY

THE CORNARO THEORY

THE PHOSPHORIC ACID THEORY

THE SOUR-MILK THEORY

THE VEGETARIAN THEORY

THE RAW-FOOD THEORY

THE ELECTRICITY THEORY

DIGESTION-PROMOTION THEORIES

EFFECTS OF SALT AND SUGAR

EFFECTS OF TEA, COFFEE AND ALCOHOL

HOW TO EAT

WHAT TO EAT

WHEN TO EAT

HOW TO AVOID OVEREATING

SOME GENERAL CONCLUSIONS



INDEX

	Page.
Air, importance of fresh.....	105
Albuminous foods	74, 75
Alcohol	37, 41, 98
Alkalies	54
Apoplexy	14, 31, 48
Appetite, to control	89
Arteries	14, 40, 42, 51, 116
Atrophy, senile	30, 33, 53, 121
Bathing	27, 107
Bladder and Kidney diseases.....	15, 49, 75, 91, 96, 102
Bones	15, 17
Brain-workers food for	74
Brain-workers, long lives of.....	111
Bread	58, 71, 75, 77
Breakdown, general	16
Breathing	105
Browne, Sir J. C.....	120
Buttermilk. See Sour-milk	30, 35
Cabbage	71
Calcareous deposits	14, 17, 41
Carbo-hydrates	70, 74, 81, 83
Cereal foods	41, 58, 63, 70
Coffee	97
Cooking	63, 67, 92
Cornaro theory	44
Cornaro, Luigi facts about.....	44, 46, 125
Diet for the aged	45, 59, 78
" " Brain-workers	74
" " Diabetics	82
" " Indoor-workers	60, 82
" " Rheumatics	81
" " Stout persons	80
" " Summer	83
" " Winter	83
Digestion promotion theories	118
Digestion	25, 39, 68, 71, 113, 118
Distilled water	18
Drinking with meals.....	69, 81, 89
Dyspepsia	85, 119
Eat, How to	68
" What to	73
" When to	84
Eating, How to avoid over.....	89
" How to tell when over.....	87
Effects of mental-state on digestion.....	69, 113
Electricity theory	115
Exercise, facts about	101, 111
Fats	25, 75, 77, 81
Fats, how to aid the digestion of.....	25

INDEX

	Page.
Fatigue	68, 103
Fish	75
Food, amount required	76
Foods, facts regarding	47, 53, 74, 76, 81, 127
Foot-baths	108
Friction	103
Fruits	53, 66, 81
Game foods	75
General conclusions	123
Gubler theory	40
Hot and cold bathing	107
How to eat	68
How to keep cool in hot weather	83
How to tell when over-eating	87
How to avoid over-eating	89
Inactivity, results of	102
Influence of mental state on digestion	68, 69, 113
Intestines	32, 33
Intestinal putrefaction	30, 32, 36
Lactic acid	36, 38
Life, complex facts of	123
Long lives of brain-workers	111
Mastication	70
Meals, number of	84, 90
Meat, diseased	60
Meat-eating	41, 57
Meat, how to tell wholesome	61
Mental factor, the	110, 126
Metchnikoff theory	29
Milk, sour	30, 35, 38
Minerals, etc., in water	19
" in foods	41, 53, 58, 63, 92
Obesity	79, 80, 88
Olive oil theory	24
Ossification	14, 17, 40, 50
Oxygen	51, 53, 105
Passive exercise	103
Pepsin and pancreatin	118
Phenomena of old age	13, 30, 51, 88, 121
Phosphoric acid	50
Raw-food theory	63
Raw-foods, dangers of	66, 127
Salt effects of	19, 91
Senile decay	29, 30, 112, 121
Skin, the	14, 26, 91, 103, 107
Sleeping, facts regarding	109
Sleeping-draught, a	110
Starchy foods	70, 74, 76, 81, 82, 96
Starch, effects of	76
Sugar	76, 82, 95
Tea, effects of	97
Teeth	15, 79
Typhoid and other fevers	21, 127
Urea	48
Urine test	87
Vegetarian theory	56
Vegetarian diet, facts regarding	42, 56
Water, facts about	18
What to eat	73
When to eat	84

PREFACE

"Brevity is the soul of wit." It is also the key to clearness, for a judicious brevity insures directness and definiteness of statement, thus leaving the mind in no doubt as to the meaning intended.

Advocates of theories are, usually, so full of their subject, and so anxious to prove their contentions that they do not stint a few hundred pages more or less in the effort to convince us. As a result their volumes are invariably heavy, if their arguments are not. Nor can exhaustive treatment be condemned, viewed from the standpoint of positive science which requires convincing evidence.

But for persons who wish to get directly at the essential features of the various theories and doctrines, or who wish to know the present status of a certain line of thought or subject of investigation, it is an important advantage to have clear, concise explanations, relieved of confusing and interwoven details; and so arranged that the theories can, as it were, be contemplated in one group.

PREFACE

For such persons, this work was prepared; and brevity, carried almost to the extreme of making the explanations mere statements of facts, has been the plan pursued.

Many writers on hygiene tell us that to study health is a solemn duty—that life is sacred—that long life is desirable, etc., etc. All this is taken for granted in this work. It is also presumed that the reader has read other works on this and kindred subjects, and has some knowledge of the general principles of hygiene.

THOMAS BERSFORD.

Theories and Facts for Students of Longevity and Health

THE PHENOMENA OR CHARACTERISTICS OF PHYSICAL DECAY

In dealing with this subject it is of importance to understand the phenomena or characteristics of physical decay because, 1st, they explain the complaints and diseases incidental to old age, and, 2d, because they suggest some of the means of prolonging life.

Two thousand years ago, Hippocrates stated that old age brings with it: Affections of the lungs and difficulty of breathing, deafness and imperfect vision, wakefulness, vertigo, apoplexy, disorders of the bladder and kidneys, diarrhoea, cutaneous irritation, articular diseases and gout.

Stated more fully, the characteristics are as follows:

THE SKIN

Instead of being soft, moist and warm, the skin becomes harder, drier, wrinkled, colder and less sensitive, also more or less rough and impermeable and subject to constant irritation. Finally it becomes shrivelled and benumbed.

THE CIRCULATION

The circulation of the blood becomes impeded by the deposition of calcareous matter, thus tending to prevent communication between the various parts of the body. The arteries become more and more hardened, or ossified, as it is commonly called. In becoming ossified they lose their cohesion, are less elastic, and are more apt to break under any extraordinary impulse. When this happens the blood sometimes breaks down the tissue in the lungs and part of the blood is coughed up. Sometimes, in its effort to find an exit, the blood presses on and disorganizes some portion of the brain and induces apoplexy and paralysis. Sometimes the heart or one of its neighboring large vessels bursts, causing death. Of persons dying between the ages of 55 and 65 over 35 per cent die from apoplexy and the percentage increases with the increase of age.

THE MEMBRANES

The membranes of the body, stomach and intestines diminish in activity and capacity. The muscular membrane becomes thinner; sometimes the muscular coat becomes paralyzed, and the mucous follicles diminish so that less fluid is secreted.

THE BONES

The bones become more and more brittle and are liable to fracture from a very slight fall.

THE BLADDER AND KIDNEYS

With failing vitality, weaker digestion, less power of assimilation of food, and less power of elimination through the pores of the skin, more and more work is thrown upon the kidneys and bladder. Hence, in old age, the kidneys and bladder are very frequently affected or diseased, and owing to the less active elimination, the saline particles, formerly carried off, deposit and coalesce, and, by gradual increase, produce stone in the bladder. Sometimes the muscular coat of the bladder becomes paralyzed. (This latter phenomenon is often due to delay in emptying the bladder when nature suggests.)

THE TEETH

The teeth become diseased, their roots absorbed, and, by the shrinkage of their sockets they fall out.

THE EYES AND EARS

The eyes and ears, which are related to and affected by the condition of the skin, lose a portion of their power. At sixty cataract often appears, and, like other tissues of the body, the lens of the eye becomes more solid and therefore less transparent, thus affecting the passage of light.

GENERAL BREAKDOWN

At about the age of sixty-three there is frequently a complete breakdown of the whole system. Such sudden collapses, when they occur, usually follow some shock, privation, suffering, feverish excitement, intemperance, or mental depression; or from marriage contracted late in life.

THEORIES REGARDING THE CAUSE AND PREVENTION OF CAL- CAREOUS DEPOSITS

What is probably the most striking phenomena of old age, viz: ossification or the hardening of the arteries, and the accumulation of calcareous matter in the joints and connective tissues, is commonly ascribed to the existence of an excess of calcareous salts, or salts of lime, in the body. These salts, of which bone is composed, are valuable in youth and during the growth of the structures. But when growth is completed a small quantity suffices for the bodily needs. So long as the eliminating forces of the body are active and powerful any excess of these salts is easily expelled, but when these forces diminish or fail, the salts deposit on the weak or less active spots, and by accumulating gradually produce such widespread ossification that the pliability or suppleness of the limbs, joints and arteries is destroyed.

This theory of the cause of ossification has led to the following theories for its prevention, viz:

THE DISTILLED WATER THEORY

The distilled-water theory is that water, when pure, owing to its great solvent power and readiness to take up substances, whether they be gaseous, liquid or solid, has a natural tendency to absorb, "take up," or hold in suspension, mineral matter, while the fluidity of the water makes it a vehicle to carry off such matter. The more pure the water, or the less mineral matter it holds, the greater the amount it is capable of taking up, hence, theoretically, distilled water, being entirely free from all impurities, has the maximum of absorbing power; and it is claimed that, if it is regularly taken in sufficient quantity, it will carry all excess calcareous matter out of the system.

Care should be taken that no lead finds its way into distilled water, as such water rapidly takes it up. Many cases of lead poisoning have occurred on board ships through the drinking of "condenser" water that had come in contact with lead, either in the apparatus or by passing through zinc pipes with lead in their composition.

It should be noted, however, that water, whether

hard or soft, will corrode lead, and form compounds with it which, if dissolved, render the water poisonous, but it is only when the lead is dissolved in it that the water is dangerous.

According to some authorities on chemistry, whether the water will dissolve the lead does not depend so much on the hardness or softness of the water as upon the amount of carbonic acid in the water. When ordinary water comes in contact with lead the free oxygen it contains combines with the metal, forming oxide of lead, with which the water immediately unites, producing hydrated oxide of lead, which is nearly insoluble. But if there is much carbonic acid in the water, a bicarbonate of lead is formed, which is very soluble and therefore remains dissolved in the water. Waters, therefore, which have considerable free carbonic acid and those that contain bicarbonates of lime, magnesia and potash are most liable to become poisoned by contact with lead pipes or tanks, etc. Common salt in water also acts upon lead, forming a soluble poisonous chloride of lead.

If the water contains organic matter or vegetable or fatty acids or sour milk its corrosive action is increased and it is more likely to dissolve the compounds formed.

If other metals, such as zinc, tin or iron, are also

in contact with the water and lead a galvanic action results which greatly increases the corrosive effect of the water on the lead.

SOFT WATER BEST

Rain water or soft water, although not entirely free from foreign and organic matter, is free from dissolved mineral substances. It is the healthiest water to drink. It makes its way into the tissues far more readily than hard water, and exerts a more powerful solvent or extractive action and is therefore a better vehicle in every way than hard water.

Great benefits have resulted from its use by persons who had previously used water impregnated with mineral substances.

Soft water is also best for culinary purposes, being more solvent and extractive.

Hard water looks more attractive than soft water, owing to the life and sparkle it acquires from the carbonic acid and mineral matter it holds in solution. The carbonic acid increases the solvent power of the water upon mineral substances, hence the more sparkle or the more carbonic acid, the more mineral substance the water is likely to have.

WATER A GREAT FACTOR

Whether pure water will, as is claimed, effectively carry the excess calcareous matter from the systems

of aged persons may perhaps be open to question, although, theoretically, it should certainly have a tendency to do so; but, that the nature or kind of water we drink has a powerful influence upon our health, is beyond question. Water containing sulphate of lime, chloride of calcium and magnesia salts has a decided tendency to produce derangement of the stomach and intestines. Hard water from sandstone rocks usually produces dyspepsia and constipation. River water that holds in solution large quantities of particles of clay and mud frequently produces diarrhoea, as will also water containing mineral sulphates, or nitrate of lime, or chloride of sodium, while water containing much organic matter will sometimes produce purging, vomiting, cramps, etc. Dysentery, cholera and various fevers frequently result from the use of water containing sewerage or decaying or putrifying substances.

The use of water containing much lime and magnesia salts frequently causes goitre and swellings of the neck, which are usually cured when purer water is used.

TO PURIFY WATER

The methods used to purify water are, distilling, boiling, freezing, filtering and the use of chemicals or of electricity.

DISTILLING

Distilling is the most thorough method of purification, but distilled water requires to be aerated to be palatable. To be perfectly pure it should be re-distilled at low temperature in silver vessels.

BOILING

Boiling the water kills all the organic life it contains, expels the gases and precipitates carbonate of lime. This latter is the cause of the fur or crust so frequently seen lining kettles and boilers.

FREEZING

Freezing the water expels a large portion of its saline and mineral matter. Carbonate and sulphate of lime may be thus got rid of.

PURIFYING BY CHEMICALS

Small pieces of alum will clear muddy water, but makes the water harder than before. Permanganate of potash destroys organic matter and ammoniacal compounds by rapid oxidation, and travelers use it (in small quantities) with great advantage for that purpose.

FILTERING

Filtering adds greatly to the purity of water, especially when the filters have a thick layer of char-

coal, as the charcoal in addition to its sieve-like action, has a chemical effect by bringing the oxygen it holds into contact with any oxidizable matter in the water.

Animal charcoal is better for this purpose than vegetable charcoal. It will remove about eighty-five per cent of organic matter, and twenty-eight per cent of mineral matter.

After passing about sixty gallons of water through about one pound of charcoal, the charcoal should be cleaned or renewed. Charcoal may be cleaned by exposure to air and a slight heat.

THE OLIVE OIL THEORY

The olive oil theory is that, when regularly taken, both internally and externally, olive oil keeps the joints, muscles and arteries soft and pliable, and also aids the digestive process, in addition to supplying heat and force to the system.

This theory has been strongly advocated by several very hale old men, one Californian centenarian, who enjoys astonishing activity for one of his age, being particularly emphatic in asserting that his health and long life are attributable to the regular use of olive oil. It is also claimed for olive oil that it is a powerful aid to the digestive and eliminative processes, and an acceptable and effective means of giving heat to the body.

As weak eliminating power and loss of heat in the body are two of the salient phenomena of old age, anything that will prevent or diminish these disabilities will aid materially in prolonging life.

Olive oil, like other oleaginous substances, will

undoubtedly furnish heat to the body. And its effects upon the liver is perhaps little inferior to that of cod-liver oil. It is also true that oily matter is favorable to the eliminating process, as is shown by the action of infusions of flax-seed, etc., upon the kidneys and bowels. But, apart from its greater palatability, it is not apparent that olive oil possesses any advantage over other oils in these respects; and, while it may be more acceptable to the palate than cod-liver oil, it is doubtful whether it is any more easily assimilated, and that is the great difficulty with oleaginous substances.

Fat appears to influence the assimilation of other principles, and to be concerned in tissue formation, besides contributing to force production. And it is believed that a deficiency of it in the food is sometimes the source of the development of the scrofulous and strumous states. The supply of fat-food, even for inactive persons, should not be less than about one and a half ounces daily, and about three ounces for active persons.

HOW TO AID THE DIGESTION OF OILS AND FATS

The reason fats are difficult to digest is that they offer resistance to the attack of the gastric juices. Digestion is effected by the agency of a watery

secretion, and substances permeated with fat are difficult for a watery substance to penetrate; hence it can only attack the surface progressively. When the substance is reduced to minute particles the penetration is more easily effected. From this it is evident that the best way to take oils or fats is in conjunction with some food that can be thoroughly masticated.

THE EXTERNAL USE OF OLIVE OIL

The external use of olive oil has been recommended from the most ancient times. An old Roman writer relates that a hale centenarian was one day asked, by Emperor Augustus Caesar, how, or by what means, he had reached to so great an age with the full enjoyment of his mental and bodily faculties? The man replied: "By applying oil to my skin, and mead to my stomach."

Modern medical authorities also commend the external use of olive oil. The following fine explanation of its use is from a work by Sir Henry Thompson, a noted physician, and (himself) an example of healthy, active old age:

"It should be remembered that the skin always tends to become drier and harder as age advances, and therefore acts less freely as excreting organ,

which it is, a large and important one. The true skin is largely made up of minute capillary blood-vessels which lie closely beneath the surface of the dry cuticle. These gradually become diminished and the circulation through them less active, a condition partly remedied by daily exercise." * * *

"The bath, commencing at say 99 degrees should gradually be brought up to at least 106 or 108 degrees for thrée or four minutes. Soap should now be used to every part, aided by a soft flesh-brush, and should be washed off by water at the same high temperature. Then, leaving the bath, the surface of the body should be rubbed with a large sheet of thick white toweling which completely covers it. When this is accomplished, the bather should now thoroughly rub into every part of the surface of the body (using the palm of the hand for the purpose) some pure olive or salad oil, say a teaspoonful at a time, especially into those regions where the skin is drier and thicker than the rest, as on the outer sides of the thighs and hips. An ounce (two table-spoonfuls) at least should be used. The ancient Romans, who spent so much time in the hot bath, well knew the value of applying oil afterwards to replace the loss of prolonged immersion in hot water, and used it largely for the purpose. The natural supply of moisture during the prime of life

is gradually diminished by age; but a greatly improved condition of the skin may be secured by the proceeding described. Under such treatment it becomes supple and healthy, and, at the close of the performance, some five minutes should be devoted to gentle calisthenic exercises, to bring into action, as far as possible, all the muscles of the body."

THE METCHNIKOFF THEORY

Professor Elie Metchnikoff of the Pasteur Institute, Paris, has lately advanced a theory upon the subject of longevity that is worthy of the most careful consideration, not only because it is advanced by a man of the highest attainments in his branch of research (bacteriology), but because the arguments advanced in support of the theory are of a strong and convincing character.

His theory is that senile decay is mainly due to the destruction of the higher cells (i. e., the cells that subserve the higher functions of intellectuality, sensation and control of movement) by cells of an inferior kind (referred to by him as macrophags) which after destroying the higher cells occupy their places, and form a connective tissue which develops and spreads, and finally causes what is known as the arterial sclerosis of old age. Hence it would follow that to strengthen the higher elements, the nervous

hepatic, renal and cardiac cells, and to diminish the number and activity of the macrophags is of the highest importance in combating old age.

Along with this theory, the professor states his belief that: (1) Putrefaction of food in the intestine is the cause, and (2) That the large intestine is the principal seat, of the bacterial flora whose poisonous influence creates the pernicious activity of the macrophags; and (3) That sour milk tends powerfully to hinder or overcome putrefaction of the intestinal contents.

Although the foregoing explanation states substantially the essential features of Professor Metchnikoff's theory, it will perhaps be more fully comprehended by a study of the following carefully selected extracts from his works:

"In senile atrophy the same condition is always present: the atrophy of the higher and specific cells of a tissue, and their replacement by hypertrophied connective tissue" * * * "In the liver the hepatic cells, of great importance to the nutrition of the organism, yield to connective tissue. In the kidneys it invades and blocks the tubes by which the necessary process of eliminating soluble waste matter is accomplished."

"In other words, a conflict takes place in old age between the higher elements and the simpler and

primitive elements of the organism, and the conflict ends in the victory of the latter. This victory is signalized by a weakening of the intellect, by digestive troubles, and by lack of sufficient oxygen in the blood."

"The word conflict is not used metaphorically in this case. It is a veritable battle that rages in the innermost recesses of our being. Distributed throughout every part of our bodies are certain cells which fulfill special functions of their own. They are capable of independent movement and also of devouring all sorts of solid matter, a capacity which has gained for them the name of phagocytes or voracious cells. The function these phagocytes fulfill is a very important one, for it is they that congregate in vast numbers around microbes or other harmful intruders in order to devour them. Effusions of blood and other elements, on penetrating the parts of the body where their presence is disadvantageous are absorbed by the phagocytes. In cases of apoplexy where blood is shed into a part of the brain, setting up paralysis, the phagocytes cluster around the clot and devour the blood corpuscles it has encased. This absorption is a lengthy process, but by degrees, as the pressure of the effusion of blood is removed from the brain and paralysis disappears, the health of the organism is

restored, recovery in such cases is due to the work of phagocytes.

"The macrophags play a very important part in bringing about senile decay. The atrophy of the kidneys in old persons is attributable to their agency. They accumulate in large quantities in these organs, clustering around the renal tubes which they ultimately cause to disappear. Having appropriated the place of the renal tubes the macrophags proceed to form connective tissue which thus takes the place of the normal renal tissue. A similar process occurs in the organs that degenerate in old age. In the brains of old persons and animals for instance, it is known that a number of nervous cells are surrounded and devoured by macrophags.

"The human intestine contains an enormous quantity of bacteria, which according to Strassburger, increase at the rate of one hundred and twenty-eight thousand billions a day. These microbes, of which there are few in the digestive portion of the alimentary canal, are very numerous in the large intestines, i. e., in the lower part containing the waste material.

"The remains of undigested foods and the mucous secretions form a medium very favorable to the growth of microbes. This bacterial flora constitutes a third part of the human excreta. It is very varied

and contains an immense number of different species. The distribution of this bacterial flora shows that it contributes nothing to the well-being of men, being scanty in the digestive portions of the body and abundant in the gut. This fact alone suffices to refute the theory of those who attribute great functional importance to the intestinal flora."

Professor Metchnikoff then cites cases to show that the microbes are not necessary, and that they give rise to fatal maladies, and that even the large intestine which harbors them can be dispensed with. He regards the large intestine as a decided disadvantage to man, in fact he says, "mammals have acquired the advantage of a large intestine at the expense of longevity." "Birds live longer than mammals and are practically devoid of a large intestine."

"Judging from the investigations mentioned above, I think I am justified in asserting that senile decay is mainly due to the destruction of the higher elements of the organism by macrophags. This conclusion has been confirmed by means of direct observation, which was the more necessary, as it is contrary to the opinion of some biologists."

"So universal a symptom of old age is the invasion of the tissue by macrophags that it must be regarded as of immense importance."

"It would appear, arguing from this, that one

means of fighting against old age, pathologically speaking, would be to strengthen the higher elements of the organism and to weaken the aggressive capacities of the phagocytes."

The professor suggests the use of sour milk to overcome or reduce the evil of putrefaction in the intestines. His views on that subject are to be found under the title of: The Sour-milk Theory.

THE SOUR-MILK THEORY

Although many of the peasantry of Europe have long claimed that buttermilk possesses medicinal properties, it was not until quite recently that medical men regarded such claims seriously.

Among those who have investigated the properties of sour milk are Professor Metchnikoff of the Pasteur Institute, Paris; Professor Hermann Strauss of the University of Berlin, and Dr. Ludwig Rheinhardt of Vienna. Dr. Rheinhardt declares that milk which, after being reduced to a certain temperature, is allowed to become thick and sour, is a sovereign remedy for many digestive maladies, and a veritable elixir of life, prolonging life materially if regularly taken. He instances the fact that many Bulgarians who use milk so prepared as food live over a century.

Professor Strauss asserts that milk curdled by the Bulgarian method has an influence in postponing bodily decay, the micro-organisms it contains de-

stroy microbes which increase the susceptibility of the body to disease.

Professor Metchnikoff's views are more fully stated in the following extracts from his works:

"In the investigation of the factors that hinder putrefaction, it has been noticed that milk putrefies with considerable difficulty, whereas meat, preserved under the same conditions, decomposes very readily. Investigators have attributed the stability of milk to the presence of casein or of milk-sugar. However, investigations recently made by Bienstock and confirmed by Tissier and Martelly, have proved the existence of certain microbes that hinder the putrefaction of milk. These are in particular the microbes that sour milk, i. e., cause the formation of lactic acid, and which are antagonistic to the microbes of putrefaction. The latter multiply only in an alkaline medium. The lactic acid microbes produce large quantities of acid and so hinder the multiplication of the organisms of putrefaction.

Putrefaction takes place rapidly, in spite of the presence of lactic acid microbes if there be added soda to macerations of meat or milk. Such facts explain how it is that lactic acid frequently stops some cases of diarrhoea and why treatment with lactic acid is so useful in maladies associated with putrefaction of the intestinal contents. It makes

intelligent, moreover, the medicinal value of fermented milk. (He had alluded to the intestinal diseases of children.)

"Roviglie, an Italian physician, drank daily a litre and a half of kephir, a preparation made by subjecting milk to lactic acid and alcoholic fermentations. He found that in a few days the products of intestinal putrefaction in his urine either disappeared or were greatly reduced."

"It is plain, then, that the slow intoxications that weaken the resistance of the higher elements of the body, and that strengthen the phagocytes, may be arrested by the use of kephir, or still better, of soured milk. The latter differs from kephir in that it contains no alcohol, and alcohol in time diminishes the vitality of some important cells in the body. The presence of a number of the lactic acid bacteria is inimical to the growth of the bacteria of putrefaction and so is of great service to the organism."

"But it is not enough merely to introduce useful microbes into the body. We must also prevent the entrance of 'wild' microbes. Soil, especially when it has been manured, contains a large number of microbes, many of which are harmful. Bienstock found that the soil of the strawberry beds in his garden contained the bacilli of tetanus."

In justice to Professor Metchnikoff, and for those who have not read his works (*The Nature of Man, The Prolongation of Life*), it is well to note that he does not claim that sour milk is an elixir of life, and he by no means claims the influence of macrophage is the only factor entering into the problem of old age. Regarding his theory, he modestly says: "Let me at once warn the reader that this is not presented as a definite, but as a possible solution of the problem, and is offered for consideration like many other scientific hypotheses on scientific questions."

A. H. Hoy, M. D., in his work, "Eating and Drinking," says, of buttermilk: "Many have discovered that it causes biliousness, as it is called, in their cases; others find that it agrees well with their digestion. Chemically, buttermilk is simply milk with most of the fat removed and the lactose or sweetening principle converted, more or less completely, into lactic acid by the specific microbe of lactic fermentation. The albuminoids it contains render it quite nourishing. It is a fluid that soon decomposes; therefore, the fresher it is, the fewer microbes it contains, and the more wholesome it will be found. Certain it is that it has no place in the diet of children, nor is it proper for anyone with the acid diathesis to drink it, for such persons are

made bilious by its use. Those persons who secrete an abnormal amount of hydrochloric acid, however, may take it without harm, because this acid destroys the microbes in it, and prevents their doing harm in the small intestine, while the nourishing albuminoids of the buttermilk are easily digested. It is to be considered on the whole more as a remedial agent, which may be beneficially used in certain forms of illness and also in some derangements of digestion, than as a drink for healthy people.

"It is likely to contain, besides the comparatively harmless lactic acid ferment, an uncertain number of other microbes whose ptomaine-making power it is hard to estimate, and it is these that render buttermilk unsuitable as an exclusive diet for any length of time."

THE GUBLER THEORY

In an essay on cretaceous degeneration of the arteries, published in the *Annales d' Hygiene*, Paris, Dr. Gubler, Professor of Therapeutics, Paris College of Surgeons, advanced the theory that a vegetarian diet, and particularly a diet of pulse foods, hastens calcareous degeneration of the arteries. The following are extracts from his essay:

"As age progresses, and under the influence of conditions still imperfectly determined, the inner wall of the arteries, supple and elastic in its normal state, thickens gradually, and becomes indurated in such a manner as to offer to the exploring finger similar resistance to that of a bird's feather or the windpipe of a chicken, according as the degeneration is uniform or disposed in circular zones alternately with rings relatively healthy.

"By anatomic examination it is found that the thickening and induration of the vascular membrane is due to the accumulation of a whitey yellow

granulous and fatty substance, but essentially of a mineral composition, the greater part of which is represented by the carbonates and earthy phosphates."

"No doubt alcohol is a great evil. Still there is no need to exaggerate, and for my part I am convinced that modern physicians have not always been able to avoid imputing to alcoholism (so fruitful in dangers to health and life) symptoms the real cause of which they were unable to discover." "I do not pretend to absolutely exonerate alcohol from all share in this calcareous degeneration. I merely believe I can establish that this poisonous agent is neither the sufficient nor the principal cause of the pathological phenomena under consideration." "As a matter of fact, I have had occasion to see many subjects of premature arterial induration who have emphatically affirmed their sobriety. Among these there are those whose sincerity can hardly be questioned, and respecting many of them I obtained information entirely favorable; without counting that the youth of some of them made it impossible that habits of drunkenness could have existed."

"Now meat and the albuminous substances contain very little mineral elements, while cereals are well supplied with them. It is the leaves of plants that possess the function of condensing and retain-

ing in their tissues the mineral matter in solution in the ascending sap, and these organs, in decaying, yearly restore to the soil the earthy salts the plants have received. Such is the physiologic reason for the enormous proportion of earthy matter which the consumption of green portions of plants, and especially of the pulses, introduces into the human economy, and into that of the herbivorous animals."

"The correctness of these views may be easily verified. If, as I think, the cretaceous incrustations of the arteries have their origin in the earthy matters supplied in a vegetarian regime, concurrently with drinking waters charged with earthy salts, they will be more frequent, more premature, and more serious in chalky districts; rarer, and even absent, in siliceous districts. Well, Dr. Leblanc informs me that he has been struck by the prevalence of this morbid state among the peasants of l'Orleans. On the other hand, in a region absolutely devoid of lime, and where the fowls can scarcely make shell for their eggs, one of my friends, who is not a doctor, (although he can feel pulses), but who is well read in science, has not remarked any hardening of the arteries except in the case of those well advanced in years. My friend, Dr. Vibert, who occupies a position at Puy, informs me that in that granite and volcanic region atheromatus degeneration is rare."

"In short, if I am right, atheromatus and calcareous degeneration affect particularly the sects pledged to pulse eating, whose recruits come from the better class, as well as the religious orders vowed to monasticism and to the vegetable nourishment. Such was the case in a convent of Trappists recently visited by Dr. Raymond. My friend, who had acquaintance in the place, was able to assure himself that among ten monks still young, and especially in the case of the prior, who was only thirty-two years old, the radial arteries were already markedly indurated."

THE CORNARO THEORY

Luigi Cornaro of Venice (born 1467, died 1566) is famous for his theory (and for his successful demonstration of the practicability of his theory) that to live to a good old age "one must restrict one's diet to the smallest quantity required by nature."

Cornaro found, at the age of forty, that his constitution was broken; he had a serious illness from which he was not expected to recover; and it was only by long and painstaking care that he was "pulled through." It was from this that, under medical advice, he adopted a very temperate life and a restricted diet. The benefits he derived from this policy led him to the conclusion that it was the real secret of health. He claimed to have ascertained, by observation and experiment, the precise quantity, in ounces, of solid and liquid food required to nourish his body.

He wrote four essays on the subject of regimen and diet for the aged. He wrote the first when

eighty-three and the last when ninety-five. In these he endeavored to show that with increasing age and diminished powers a corresponding decrease in the quantity of food must be taken in order to preserve health; thus he says: "There are old lovers of feeding who say it is necessary they should eat and drink a great deal to keep up their natural heat, which is constantly diminishing as they advance in years, and that it is, therefore, their duty to eat heartily. To this I answer that our kind mother nature, in order that old men may live to a still greater age, has contrived matters so that they shall be able to subsist on little, as I do, for large quantities of food cannot be digested by old and feeble stomachs. By always eating little, the stomach, not being much burdened, need not wait long to have an appetite. It is for this reason that dry bread relishes so well with me, and I know it from experience and can with truth affirm, I find such sweetness in it that I should be afraid of sinning against temperance, were it not for my being absolutely convinced of the absolute necessity of eating moderately of it; and that we cannot make use of a more natural food. And thee, kind parent Nature, who acted so lovingly by thy aged offspring in order to prolong his days, has contrived matters so in his favor that he can live upon very little, and, to add

to the favor, hast made him sensible that as in his youth he used to eat twice a day, when he arrives at old age he ought to divide that food, of which he was accustomed before to make but two meals, into four meals; because thus divided it will be more easily digested, and, as in his youth he made two collations in a day, he should in his old age make four, provided however he lessens the quantity as his years increase, and this is what I do. My spirits are not oppressed by much food, but, barely kept up, are always brisk, especially after eating; so that I am obliged, then, to sing a song and afterwards to write. Nor is my understanding ever clearer, nor am I apt to be drowsy; the food I take being too small in quantity to send up any fumes to the brain. Oh, how advantageous it is to an old man to eat but little. Accordingly, I, who know it, eat but just enough to keep body and soul together." "What with bread, meat, the yolk of an egg, and soup, I ate as much as weighed in all twelve ounces, neither more nor less. * * * I drank but fourteen ounces of wine."

Owing to the fact that the quantity and character of nutriment needed by the body varies with climatic changes, and the amount of labor, exercise or nerve force expended, Cornaro's plan of adhering rigidly to a weighed and measured diet cannot be

fully endorsed. We do not walk the same number of steps or have the same amount of exercise or work every day. The amount of nervous energy expended varies largely with the events of the day, which may bring forth a meeting with good company, an unusually pleasant time, intensely interesting recreation, or the reverse of these: loneliness, depression or anxiety.

But the essential feature of Cornaro's teaching, viz: that the amount of food taken should not exceed, or but little exceed, the actual requirements of the body, is strongly endorsed by practically all medical scientists, although it should be noted that the actual requirements of a perfectly healthy body includes sufficient to furnish a little reserve of surplus nervous energy and flesh, without which one lacks spirit, vitality and endurance.

It has been pointed out over and over again by medical men, that the amount of food required to maintain health and strength is really very small, indeed. Dr. Abernethy of London used to say that "one-fourth of what we eat keeps us,—the rest we keep at the risk of our lives."

Sir James Crichton Browne stated that: "Man's degeneration is due very largely to his diet. . . . On reviewing nearly two thousand reported cases of persons who lived more than a century, we

generally find some peculiarity of diet or habits to account for their longevity. . . . Some ate one meal a day, others four or five; a few ate large quantities of food, others a small amount, . . . but in those cases where we have been able to obtain reliable accounts of the diet we find one great cause which accounts for the majority of cases of longevity, namely: moderation in the quantity of food."

The evil effects of over-eating are so numerous and, often, so serious that the dietary should be given very close attention by all students of health. Headaches, biliousness, troubled sleep, nervousness, irritability and a sluggish brain are among the minor penalties of over-eating; the more serious ones being apoplexy, Bright's disease and heart failure.

Young and active persons can eat more than they need without much immediate suffering, especially if they spend much time in the open air; the reason of this is the large amount of oxygen they bring in contact with their food. The oxidation of nitrogenous food aids its conversion into what is called urea. (Urine is largely composed of urea.) When urea is perfectly oxidized it is soluble in the blood and can be excreted from the system by being filtered out through the kidneys. But when the process of oxi-

dation is imperfect the food substance is not converted into urea, or the kind of urea that is readily soluble in the blood. It is therefore difficult to filter out through the kidneys, and it becomes irritating and poisonous, forming uric and lithic acid. When this acid settles in any joint or tissue it forms rheumatism or gout. When it exceeds a certain quantity it causes disease in the blood-vessels, and develops into apoplexy and heart disease; when it causes a chronic inflammation of the kidneys, it creates Bright's disease.

In some cases the undigested food rots in the stomach or intestines, producing poison in the blood and affecting the heart's action.

THE PHOSPHORIC ACID THEORY

In an article, published in 1893, William Kinnear advocated the use of diluted phosphoric acid in conjunction with distilled water, and stated that: "Their combined use retards old age, checks deposits of earthy matter of a gelatinous character in the human system and retards the approach of senility." The following extracts from his article give most of its essential features:

"Anatomical experiment and investigation show that the chief characteristics of old age are deposits of earthy matter of a gelatinous and fibrinous character in the human system. Carbonate and phosphate of lime, mixed with other salts of a calcareous nature, have been found to furnish the greater part of these earthy deposits. As observation shows, man begins in a gelatinous condition; he ends in an osseous or bony one—soft in infancy, hard in old age. By gradual change in the long space of years the ossification comes on; but, after middle life is passed, a more marked development of the ossific

character takes place. Of course these earthy deposits, which affect all the physical organs, naturally interfere with their functions. Partial ossification of the heart produces the imperfect circulation of the blood which affects the aged. When the arteries are clogged with calcareous matter there is interference with the circulation upon which nutrition depends." "Both Bichat and Baillie considered that the greater number of people past sixty suffer more or less from arterial ossification, which brings about obstructions in the proper and healthy circulation of the blood." * * * "The oxygen of the atmosphere is a most destructive element in many respects. Researches of a recent scientific character have shown that the origin of one of the sources of old age, namely, fibrinous and gelatinous matter, can be traced to the destructive action of atmospheric oxygen." "In the chemical changes constantly taking place in our bodies oxygen plays the most important part by all odds. By oxidation, which is a constant waste or rust of life, the physical system is hourly destroyed, and then again built up by reparation of the food we live upon. Albumen and fibrine exist in the blood, and are resolved into their component elements. By oxidation, the albumen is converted into fibrine, which nourishes the organs of our bodies. But in repairing their waste

an excess of this substance accumulates in the blood vessels, causing their induration, and thus gradually lessening their caliber. Gelatin is an oxide of fibrine, as fibrine is an oxide of albumen. Oxidation causes these substances in part to be decomposed, and afterwards eliminated through the kidneys. A constant struggle is daily going on in our bodies when in the most perfect health between accumulation and elimination. And these accumulations, becoming greater in old age than the power of elimination, produce the effects we term feeling one's age. In order to extend and prolong life, how shall they be counteracted? Let us see. Seventy per cent of the human body is water—nearly three-fourths. Not a single tissue is there in which water is not found as an ingredient. Certain salts are held in solution by this water, portions of which—notwithstanding the large quantity eliminated by the secretions—become more or less deposits in the body. When these become excessive and resist expulsion, they then cause the stiffness and dryness of old age. Entire blockage of the functions of the body is then a mere matter of time, and the refuse matter deposited by the blood, in its passage through the system, stops the delicate and exquisite machinery which we call life. This is death. It has been proved by analysis that human

blood contains compounds of lime, magnesia and iron. In the blood itself are thus contained the earth salts. In early life they are thrown off. Age has not power to do it." "Earth salts abound in cereals, bread and nitrogeneous foods. Hence a diet made up of fruit principally is best for people advancing in years, for the reason that, being deficient in nitrogen, the ossific deposits are more likely to be suspended." "Excessive action of atmospheric oxygen must be counteracted. Ossific matter deposited in the body must be dissolved as far as practicable. To produce the desired effect distilled water and diluted phosphoric acid are perhaps the most efficacious and the least harmful. Their combined chemical action retards old age. The daily use of distilled water is, after middle life, one of the most important means of preventing secretions and the derangement of health. As to diluted phosphoric acid, it is one of the most powerful influences known to science for shielding the human system from the inconveniences of old age. Daily use of it mixed with distilled water helps to retard the approach of senility. By its affinity for oxygen the fibrinous deposits, previously alluded to, are checked and their expulsion from the system hastened." "Hence, to sum up: The most rational modes of keeping physical decay at bay, are avoiding all foods rich in

earthy salts, using much fruit, especially juicy uncooked apples, and by taking daily two or three tumblerfuls of distilled water with about ten or fifteen drops of diluted phosphoric acid in each glassful."

Although there may be much truth in Mr. Kinnear's claims regarding phosphoric acid, his opinion does not appear to have been endorsed by any prominent scientists. The only reason Mr. Kinnear assigns for his belief that phosphoric acid is valuable for the purpose mentioned is that: "By its affinity for oxygen the fibrinous deposits are checked." The statement that it has an affinity for oxygen is in accord with the teachings of chemistry, which tell us that phosphoric acid absorbs oxygen and neutralizes alkalies. But such properties would appear to render its internal use a matter to be carefully considered, for it is a common belief that most people do not get enough oxygen; certainly, once food is ingested its complete oxidation is necessary, as its absorption or elimination would otherwise be retarded. And we are assured by medical authorities that a sufficient amount of alkaline matter in the saliva and digestive juices is absolutely essential to digestion. It is also a constituent of the blood. Moreover, in many disorders of the stomach and intestines incidental to old age,

in gastric catarrh, rheumatism, gout and diabetes lithium salts and other alkalies have proved very serviceable. Prof. J. M. Charcot of Paris, in his work on the diseases of old age, recommends the use of lithium salts in the treatment of gout and rheumatism in old persons. He says: "The alkalies, especially potash and lithia, when administered in very very small dilute doses, possess a remarkable action in cases of gout. . . . Lithia has a well-marked diuretic action, . . . and dissolves uric acid energetically." Prof. Liebrich says, in the *Ency. de Therapie*, "Alkalies promote intestinal digestion by helping the diffusion of the blood through the tissues, by increasing the alkalinity of the blood and the secretory activity of the liver, pancreas and gall passages."

THE VEGETARIAN THEORY

MEAT EATING VS. VEGETARIANISM

The long controversy between the vegetarians and the meat-eaters is still proceeding. Although many eminent persons are to be found on the side of the vegetarians, the preponderance of medical authority seems to be in favor of the policy of a mixed diet.

After carefully studying the arguments of both schools, it seems to the writer that they both err in making their statements too absolute, too sweeping. In claiming that the kind of diet they favor is "man's natural diet," implying that it is the universally correct diet, i. e., for the entire human species, they seem to ignore the probability that diet is something that should vary according to its adaptability to the individual constitution, the special conditions, etc.

It is doubtful whether any vegetarian would claim that a vegetarian diet is suitable or practicable for

Esquimaux or other persons living in Arctic regions. And equally doubtful whether the meat-eater believes that meat is suitable food for persons living in the tropics. Yet that is what is implied by their statements. And if they qualify their statements they may find it difficult to reach a really tenable position. Where would they make their boundary line? In what latitude or under what conditions?

In the matter of longevity, neither school appears able to claim any advantage; vegetarians and meat-eaters appearing to average about the same in length of life. In physical strength, speed and stamina there appears to be no really marked difference between those raised on a vegetarian diet and those raised on a mixed diet, provided that each is in his own environment; and this is an important qualification, for experience shows that persons raised in hot climates can seldom remain well in cold climates; and that meat-eaters from the north rapidly droop in tropical countries.

In regard to mental powers, it is difficult to make comparisons, since so much depends on education and environment; but the record of achievement certainly appears to indicate that a mixed diet is the more favorable one for mental excellence.

Some of the most eminent medical authorities claim that physiological considerations point to a

mixed diet as being most in conformity with the construction of our teeth and the anatomy of our digestive apparatus; and assert that scientific investigations corroborate the instinctive propensity for a mixed diet in temperate climates.

Some writers on diet claim that cereals and starchy foods, including bread, have a very large proportion of earthy salts, lime, etc. (one doctor refers to bread as the staff of death), and they say that such foods should therefore be eschewed by persons desirous of avoiding or getting rid of calcareous deposits in their system, while Dr. Gubler, Professor of Therapeutics in the College of Surgeons, Paris, makes precisely the same charge against pulse foods and the leaves of plants. (See his statement under heading, The Gubler Theory.)

Dr. De Lacy Evans, who made a great study of the factors of longevity, came to the conclusion that fruits, fish, poultry, young mutton and veal contain less of the earthy salts than other articles of food, and are therefore best for people entering the vale of years.

Cornaro was not a vegetarian; and, from such records as we have, it appears that very few of the known centenarians were vegetarians, and, though this fact does not prove that a mixed diet is superior to a vegetarian diet, it does prove that a meat-eater

may attain great age, though whether it is because of or in spite of the character of his diet is still uncertain.

But although all the claims made by vegetarians regarding the advantages of their system of diet do not appear to be sustained, it is incontestably true that human life can be fully sustained by a vegetarian diet, and that a change to a vegetarian diet has proved very beneficial in a large number of cases. And most authorities on diet admit that the importance of meat is largely over-estimated, and that the amount of meat eaten is usually far in excess of the bodily needs. And it is practically certain that the older a person gets the less meat he should eat, because, (1) as meat is a very condensed and essentially muscle-making food mostly suitable for persons who do hard manual labor or take active physical exercise; even five or six ounces of it may create an excess of nutritive material in the systems of inactive persons. (2) Meat is heavy, and slow of digestion, and, if a large quantity of it is eaten, it causes a large amount of blood to be sent to the stomach, and severely taxes the nervous system, hence such excess in quantity is particularly bad for the aged or for any persons whose vitality is low.

An important point to note is that to eat an excess

in animal food is much worse than excess in vegetable food, especially when the meat-eating is combined with sedentary habits; and still worse when to these are added the drinking of alcoholic liquors. According to the investigations of Dr. Pavy the amount of meat eaten by outdoor workers should not exceed about twelve ounces daily, and should constitute not more than about one-quarter of the total weight of all the food eaten. With more animal food than this, the excretory organs are unnecessarily taxed and the system exposed to the evil poisonous effects of the superfluous matter putrefying in the intestines, etc., when retained there through defective eliminative action.

For indoor-workers, and aged and weak persons generally, the amount of meat eaten should be still less.

Of course, what has been stated in favor of meat applies only to fresh meat and to meat that is free from disease. The frequent eating of salted, cured, dried or preserved meats is certainly prejudicial to health, while diseased meats produce serious maladies.

Meat may be diseased while on the hoof, i. e., before slaughter, or it may become so by decomposition through too long an interval elapsing between slaughter and consumption for food. And it

is very important to note that the sale of bad meat is by no means of rare occurrence, for, although great quantities of meat are condemned in the slaughterhouses and large meat establishments, there is no doubt that much bad meat escapes inspection, especially in the small establishments where meat is often retained so long as to become unfit for food. I feel justified from my own observation and experience, in estimating that fully five per cent of the meat consumed is not really fit for food.

When good meat is difficult to obtain it is far better to confine one's self to a vegetarian diet, or to a diet including eggs, fish, milk, butter, cereals, vegetables and fruit.

HOW TO TELL WHOLESOME MEAT

Good beef, pork or mutton is inclined to be of a light red color, approaching a scarlet hue. A pale color indicates an immature animal. A dark red indicates one old and tough. A pale pink is considered a sign of disease; and a deep purple tint indicates that the animal was not slaughtered but died with the blood in it, or had suffered from fever.

Meat should be entirely free from even a tendency to putrefaction, and should have little or no odor. Diseased meat, especially when it is chopped

and drenched with warm water, has a sickly sort of odor. A clean knife passed into the meat will aid in judging it as, after withdrawal from bad meat, the knife will smell unpleasantly. Putrefaction cannot always be detected by the odor, for meat kept on ice or charcoal, or treated with certain chemicals may be far advanced in the first stages of decomposition and yet emit no unpleasant odor.

Meat should be firm and elastic to the touch, and should scarcely moisten the fingers. Bad meat is wet, sodden and flabby with the fat looking somewhat like jelly or wet parchment. Good meat tends to become dry on standing, while bad meat runs to water, i. e., becomes wet on standing, and loses much weight during cooking.

THE RAW-FOOD THEORY

The theory that raw or uncooked food is the proper or better form of diet for man has quite a large number of advocates. This theory is a development or offshoot of the vegetarian theory; although, at one time, the notion that eating raw meat increased their strength and "spirit" was very prevalent among prize-fighters and other athletes.

The main arguments made in favor of a raw-food diet are: (1) That cooking kills the living cells in the food, that, in short, cooked food is "dead" food or "devitalized" food. (2) That cooking extracts most of the mineral salts, i. e., potassium, iron, phosphorus, sulphur, sodium, calcium, etc., natural to the food, which, when the water in which the food is boiled or the grease in which it is fried, etc., is thrown away, are entirely lost. (3) The digestion of bread, cereals, and starchy food generally, and also pulse foods, involve great loss of digestive and nervous energy. These foods

also contain a much greater proportion of earthy salts than other foods and therefore cause more calcareous matter to form in the system. (4) The water used in boiling, stewing, etc., contains much lime and earthy salts which are deposited on or permeate the food; the evaporation of the water necessitates the constant addition of more water to prevent burning; thus food, so cooked, has all the lime, etc., of the water added to what is naturally contained in the food. To these may be added an argument made by Mr. Horace Fletcher, viz: "That man, like his nearest relative, the monkey, is naturally a frugivorous animal."

I have looked in vain, in the works of authorities on chemistry and diet, to find any confirmation of the view that "dead" or devitalized (i. e., cooked) food is less beneficial than raw food. In the absence of facts from scientific investigation the subject can only be treated logically.

We know that it is injurious to eat decaying or putrefying food. There is therefore a decided limit to the degree of "deadness" at which food can be eaten with benefit. But we also know, and see it proved daily, that "dead" food is readily transformed into flesh and blood. Millions of people eat nothing but cooked food; seldom eating even a little fresh fruit. We also know that plants transform inor-

ganic, i. e., lifeless matter into living vegetable matter.

It is certainly not obvious why the assimilation of food should be any less readily effected, or why the quality of the tissue, etc., resulting should be rendered inferior by the circumstance of its cells being killed in the process of cooking instead of being killed in the process of digestion; for they would be killed by the gastric juices or anyway by the process of oxidation, etc., before they could be assimilated.

There are large numbers of persons in the world who live on a raw-food diet, and have, in addition, the tremendous advantage of leading a life in the open air; yet their average length of life does not appear to exceed the prescribed span. And although this fact by no means proves the raw-food theory erroneous, it certainly does not tend to confirm the view that eating "live" food is such an important factor, or will do so much to promote longevity as is claimed.

The argument that cereal foods contain much earthy salts is possibly true, but the fact rather suggests the advisability of a mixed diet,—a diet of foods judiciously mixed with a view to having the ill-effects of one kind of food neutralized by the qualities of another kind; and the insufficiency of

some foods compensated by the nutritiousness of others.

The cooking of food certainly has some disadvantages, but, on the other hand, raw food has its dangers. And, regarding these, Professor Metchnikoff says: "But it is not enough merely to introduce useful microbes into the body. We must also prevent the entrance of 'wild' microbes. Soil, especially when it has been manured, contains a large number of microbes, many of which are harmful. Bienstock found that the soil of the strawberry beds in his garden contained the bacilli of tetanus. Besides these organisms of tetanus there are many other dangerous bacteria in manured garden soil. Obviously we should eat no raw foods, but confine ourselves rigidly to food that has been thoroughly cooked or sterilized. The exclusion of wild microbes, and the introduction of beneficial microbes, such as those of lactic acid fermentation, must be of great service to health."

In addition to this advice of Professor Metchnikoff, who is one of the world's greatest bacteriologists, we have the obvious fact that there must be danger in eating uncooked or unsterilized figs, dates, bananas, etc., coming from tropical countries where dangerous fevers are common and the science of sanitation unknown or unpractised. The

sticky surface of figs and dates seem peculiarly fitted to gather dust and disease germs. Such fruits should, at least, be dipped in boiling water before being eaten. Raisins, currants, prunes and other dried fruits invariably have considerable dust on them, and, usually, some lye or sulphur. In fact, lye and sulphur have been used to such an extent in the curing or preparing of dried fruits that legislation has been made against it. It is not wise to eat dried prunes, apricots, etc., without first soaking them in water, and throwing the water away.

Fruits are unquestionably of great value both as diet and medicine, but the claim that they should be always eaten raw does not seem tenable.

Cooking renders many substances palatable that otherwise would hardly be edible, as for example potatoes, turnips, etc. It softens foods so that they can be more readily masticated, and their substance more easily penetrated by the gastric juices. And, in addition to these advantages, the aroma and warmth of cooked foods tend strongly to inspire appetite, cheer the spirits and promote digestion, especially when the weather is cold or the surroundings depressing.

HOW TO EAT

A man may be fully conversant with the etiquette of the dining-room, and yet not know how to eat—from the hygienic standpoint. Much ill-health is caused by not knowing how to eat. Scientific observation, and study of the process of digestion, teach, among other things, the following important facts:

1st. That the digestive process is retarded, the peristaltic action in the stomach and intestines decreases, and the secretion of juices diminishes under the influence of excitement or mental abstraction; and increase greatly under the stimulus of serenity and of pleasant anticipation. And yet we commonly see men go to their meals in a rush or while excited or preoccupied; some persons participate in heated discussions or become absorbed in conversation or reading, and are almost unconscious of the fact that they are eating.

One should never eat when fatigued. The exhaustion is to be overcome by rest, not by eating.

Food taken at such a time is apt to be more dangerous than beneficial. To digest a meal draws heavily on the nervous system and when the vital forces have been drawn in other directions away from the stomach, etc., the process of digestion is very greatly impaired. This effect is even greater when induced by strong mental exertion.

In the case of hard workers, there should be a short interval of say fifteen minutes of rest and relaxation between working and eating, and another short interval after eating before proceeding to work, in order that the digestive organs may, for a time, have the full use of the nervous and vital powers, so as to get thoroughly started in their work; this requires about twenty minutes.

It has been well said that the man who hurries from his work to dinner, and back to work in order to save time, will eventually lose far more time than he saves.

For the moment business should be forgotten, deep subjects of discussion or anything that taxes the brain, or affects the emotions should be avoided. An easy frame of mind and lively, sprightly and cheerful conversation should be sought and indulged in.

(2) That drinking with meals is unhealthy, first, because it dilutes the saliva and gastric juice and

thus weakens their powers. Second, by softening and liquifying the food in the mouth it tends to prevent mastication and insalivation, and enables large pieces of unmasticated food to be gulped or washed down.

(3) That a large and important part of the digestive process is performed in the mouth by means of mastication and insalivation. This is well explained in the following extract from a work by Sir Henry Thompson:

"It is essential that all food should be thoroughly divided into minute fragments by the teeth, but for all starchy foods, spoken of as carbo-hydrates, complete and prolonged mastication is, if possible, even more necessary, although they are generally soft and easily swallowed. For the act of mastication excites a constant flow of saliva into the mouth, secreted by numerous adjacent glands, a fluid containing a specific chemical agent known as ptyalin by means of which the actual process of digestion is performed in the mouth, of all the starchy products which are completely insoluble in water, converting them into glucose, which is quite soluble, and on being swallowed can therefore be absorbed as soon as they reach the stomach. This fact should never be forgotten, that the mouth is the cavity in which that large portion of our food which consists

of bread and farinaceous foods and vegetable tubers, ought to be digested by means of mastication and insalivation.

"If, however, this process is neglected, the stomach, which is capable of digesting animal food only (including milk and eggs) and has no power whatever to digest starchy matter, is liable to be deranged by the presence of much undigested bread and pudding, which, if not well masticated, must be detained there until the animal products are dissolved, when the entire contents reach the small intestine (duodenum), where digestion of the starchy matter is effected by contact with the pancreatic juice, which renders them soluble and capable of being absolved as nourishment to the system."

Dr. H. Campbell of London says: "The indigestibility of new bread would appear to be wholly due not to any peculiarity of chemical composition, but to its tendency to elude the teeth and form a sodden mass impermeable to the digestive juices, while the more powdery stale bread is more easily broken up both in the mouth and within the stomach.

Cabbage, again, owes its indigestibility to the fact that it is allowed to pass into the stomach in large masses, while the well-known digestibility of cauliflower and minced spinach is due to the fineness of their division. Were cabbage as freely minced as

spinach usually is, it would be equally digestible.

The more the subject of mastication is studied, the more one becomes impressed with its importance. One noted physician in an article on the subject, explained ten important results of thorough mastication; among others: that it strengthened and developed the teeth and jaws, thus preventing the early loss of teeth, the sinking of the jaws and hollowing of the cheeks.

The opinion has been expressed by a medical man that the habitual bolting of food, by the prolonged local irritation to which it gives rise, may predispose to cancer of the stomach.

WHAT TO EAT

What one should eat depends principally upon what one can assimilate, and this, in turn, depends upon the age, the nature of one's constitution, the amount of exertion, the climatic conditions and surroundings, the state of mind, etc.

That there is a constitutional difference is shown by the fact that some men can digest such hearty foods as cheese, pork, etc., while their companions, although apparently of similar type and occupation, cannot do so. As an old saying expresses it: "What is one man's meat is another man's poison." Nevertheless, we know that indoor-workers as a class cannot eat so much or such hearty food as out-door workers can; and that whatever the individual's powers of assimilation may be, they will vary with the degree of his activity, the nature of the weather, etc., etc. It is therefore evident that these factors should be taken into consideration. And yet we frequently find that a clerk who sits indoors nearly all day will tackle the kind and quality of food that

only a sailor or an agricultural laborer could be expected to digest. In fact it has been brought out by recent investigations into the subject of foods that the average dietary contains an excess of proteid elements. This will be readily understood by a consideration of the following:

FACTS ABOUT FOODS

Human food consists of:

(1) Protein elements (called variously proteid, albuminous or nitrogenous food), i. e., the nutritive principle in meat, cheese, beans, eggs, the gluten of bread, etc.

(2) Carbo-hydrate elements, found in starchy food, potatoes, flour, rice, sago, sugar, etc.

(3) Fats, as in butter, lard, oil, etc.

(4) Salts or mineral matter, found combined in the substance of most foods in varying quantities.

(5) Water.

(6) Oxygen.

Meat, beans, cheese, etc., are essentially "muscle" forming foods, especially suitable for those who do hard physical labor.

For brain workers the diet recommended as best consists principally (i. e., as a basis) of eggs, fish, oysters and whole wheat bread.

Fish is a good food when fresh, and is easy to digest, but it (especially shell-fish) has a tendency to cause eruptions of the skin, and should therefore be eaten very moderately by those affected with skin-diseases.

Game foods have a tendency to excite the kidneys, and it is also claimed that they predispose to gravel, to hepatic congestions and to arterial sclerosis.

Bread, particularly white bread, as it contains more starch, should be toasted brown and brittle. The starch is thus converted into glucose, which is soluble.

Fats are an important element in diet, being, in conjunction with oxygen, the great source of heat and force in the body. It is claimed that a deficiency of oleaginous food predisposes to consumption; some records of the early habits of consumptive persons show that many of them were not in the habit of eating foods containing fats, butter, etc. Fat (especially in the form of cod-liver oil) has proved a valuable aid in the treatment of consumption.

Fresh butter is the most generally wholesome of fats. About three or four ounces may be taken daily, including that which is used in the cooking.

Habitual excess of proteid foods causes enlargement of the liver, plethora of the system, imperfect

oxidation of food, leading to rheumatism, gout, kidney diseases and apoplexy.

Excess of starchy foods leads to acidity and flatulence.

Excess of sugars and fats leads to biliousness and general debility.

It will thus be seen that an excess of proteid food has more serious consequences than excess of starches and fats. Moreover, proteid foods, unless well oxidized and metamorphosed through labor or exercise and so placed favorably for discharge, are very apt to accumulate in the system. Starches and fats are much more easily eliminated.

According to Moleschott's calculations, the alimentary substances, in a dry state, required daily for the sustenance of an ordinary workingman of average weight and height, is: "Albuminous matter about $4\frac{1}{2}$ ounces; fatty matter about 3 ounces; carbo-hydrates, $14\frac{1}{4}$ ounces; salts 1 ounce—a total of about 23 ounces of solid matter in a dry state." Adding fifty per cent to this weight for the liquid that food contains in the ordinary form in which we take it (meat, bread and beans as eaten are more than half water), Moleschott's standard dietary will be seen to have 46 ounces of solid matter, of which not quite one-tenth or $4\frac{1}{2}$ ounces is of proteid food.

Dr. Pavy, in his work on Dietetics, says that "two

pounds of bread and three-quarters of a pound of lean beef contain as nearly as possible the amount of carbon and nitrogen represented as escaping from the body (i. e., used up) under average conditions in the course of a day." This equals 44 ounces of solid matter, of which meat constitutes over one-fourth. As about one-fifth the weight of meat, and about one-eighth the weight of bread is proteid, Dr. Pavy's standard diet would contain about 7 ounces of proteids.

According to Professor Gaulier of Paris, from 3 to 3½ ounces of proteids are sufficient for a healthy man. While a Danish expert on food, Dr. Hindhede, says that one or two ounces of proteids are sufficient.

It should be noted that the bread and other foods that we eat with meat, beans, eggs, etc., also contain proteid elements, and the total amount of proteids stated to be necessary includes that contained in the bread, etc.; hence we see that the actual amount of "heavy" food (meat, beans, etc.) necessary is really small. The average amount advocated by the four authorities quoted being about 4 ounces of proteids, 3 ounces of fats and 15 ounces of carbohydrates. And this would approximate the total of what would be contained in a combination of about 8 ounces of beef, 14 ounces of bread, 3 ounces of

fats, including that used in the cooking and absorbed in the food, and 10 ounces of pudding, fruit, sugar, etc. And it should be noted also that this is about the amount deemed necessary, not for one meal, but for the entire day's sustenance of a healthy working-man. By dividing this into three meals it will be seen how greatly the amount of food eaten by the average person exceeds the actual requirements of his system, especially by persons who are not healthy, and actively working in the open air.

DIET FOR THE AGED

The kind of food best adapted to the aged is suggested by the physical conditions, viz: decreasing powers of assimilation, less activity of body, less digestive capacity, decreased secreting powers of the glands.

Proteid foods, especially meats, peas, beans and cheese, tax the powers of digestion. It is therefore evident that they should be eaten very sparingly by those whose digestive powers are weak. Such persons should rather eat lightly cooked eggs, fish, stews, gruel, soups, well-cooked vegetables and fruits, well-baked bread, stale and toasted.

Sir Henry Thompson advises aged persons not to let the possession of a good set of false teeth beguile

them into thinking that they can digest heavy food. He says: "I would point out the significant fact that the disappearance of the masticating powers (teeth) is mostly coincident with the period of life when that species of food which most requires their action, viz: solid animal fibre, is little, if at all, required by the individual. It is during the latter period of his career that the soft and lighter foods, such as well-cooked cereals, some light mixed animal and vegetable soups, and also fish, for which teeth are barely necessary, are particularly valuable and appropriate." "And the man with imperfect teeth who conforms to nature's demand for a mild non-stimulating dietary in advanced years will mostly be blessed with a better digestion and sounder health than the man who, thanks to his artificial machinery (false teeth) can, and does, eat as much flesh as in the days of his youth."

Sir Henry Thompson also cautions persons who have passed middle age to avoid obesity, as it is decidedly opposed to longevity. He says: "Not one man in fifty lives to a good old age in this condition (i. e., fat and heavy). The typical man of eighty or ninety years, still retaining a respectable amount of energy of body and mind, is lean and spare, and lives on slender rations." "Neither your heart nor your lungs can act easily and healthily

while being oppressed by the gradually gathering mass around them. And this because you continue to eat and drink as when in your youth."

He advises us not to get frightened at the fact of getting thin in old age—it is an advantage. He says: "As we reach, say, fifty, less energy and activity remain, and less expenditure (of force) can be made; less power to eliminate is possible at fifty than at thirty; still less at sixty and upwards. Less nutriment, therefore, must be taken in proportion as age advances, or, rather, as activity diminishes, or the individual will suffer."

"The little luxuries and extra 'support,' i. e., the strong extract of food, the extra glass of cordial, etc., which the feebleness of old age is supposed to deserve, must not be taken. It is precisely at this period, when the eliminating power is at its minimum, that concentrated food and strong drink are to be avoided, and regarded as sources of trouble." "For the flow of blood cannot be driven into any semblance of the youthful torrent by the temporary force of stimulants, nor is it with impunity to be overcharged by the constant addition of rich elements which can no longer be utilized."

DIET FOR STOUT PEOPLE

To prevent being corpulent, it is necessary to re-

duce the use of fatty foods, such as fat meat, bacon, ham and pastry (which contains much fat), and particularly all cream, milk and starchy foods. Starch abounds in potatoes and farinaceous products, and especially in rice, sago, tapioca and corn-flour. Puddings made of such materials with additions of milk, eggs and sugar form combinations of the most fattening of all foods.

Dr. E. Densmore says: "It would naturally be expected that oil and animal fat would contribute as much to obesity as bread and starchy food. But experience proves that such is not the case. The reason for this is not, in the present state of science, understood. It will likely be found in the fact that starch foods undergo a complicated process of digestion, whereas oils require only emulsion to render them assimilable by the system."

Stout persons should also avoid drinking any liquid whatever at meal times, and, above all, they should not drink milk with heavy foods.

DIET FOR RHEUMATICS

Persons affected with rheumatism, gout, etc., should particularly eschew proteid foods and alcoholic liquors. For such persons, fruit, baked apples and stewed fruits, vegetables, toast, and plenty of water are recommended.

DIET FOR INDOOR-WORKERS

As a general rule the less meat, cheese, beans, etc., eaten by indoor-workers, the better they will feel. Their food should consist largely of cereals, good bread well baked and stale or toasted, vegetables, fruits, eggs, and milk if no meat is eaten.

DIET FOR THE DIABETIC

Persons affected with diabetes and kindred diseases may eat meat (but not liver), roasts, stews, etc., gluten bread (but not white bread), cheese, butter, eggs, fish, green vegetables that have been boiled in a second lot of water; also water-cress and most of the salad plants.

But diabetic persons should most carefully eschew sugar in any form, wheaten bread or biscuits, rice, arrowroot, sago, tapioca, macaroni, etc., potatoes, carrots, parsnips, peas, onions, pastry and puddings of all kinds, and fruit of all kinds whether fresh or preserved, and especially avoid jams, marmalades, etc., as about forty per cent of their weight is sugar.

They may drink tea, coffee, cocoa (from nibs). dry sherry, claret and liquids that have not been sweetened. But should eschew milk, sweet wines and beers, porter, stout, cider, port wine and liqueurs.

CHANGE OF DIET TO SUIT CONDITIONS

Diet for summer, and diet for winter.

Many persons suffer unnecessarily from the heat of summer, and from the cold of winter through not changing their diet to suit the changing climatic conditions.

To keep cool in hot weather, one should eat less, or eschew entirely, the kind of foods that most create heat and force in the body, viz: The fats and carbohydrates—starches, sugars, etc., and should eat more of those foods that tend to lower the bodily temperature, viz: fruits and vegetables.

Conversely, to keep warm in the winter, or to create heat in the body, one should take plenty of fats and carbohydrates and drink heating liquids, such as chocolate and hot milk.

WHEN TO EAT

When and how often one should eat depends largely upon the circumstances and condition of the individual. For vigorous persons leading a very active outdoor life, three meals of plain food a day may not prove too much; but unless one is much in the open air and employed at something involving considerable mental and physical exertion it will be found that, for an active person not much past middle age, two moderately good meals are all that are really required; anything more being superfluous and injurious in proportion to its quantity and character.

Dr. John B. Rich of New York, healthy, active and practicing his profession at the age of ninety-seven, adds his testimony to that of many men and says: "Two meals a day are enough for anybody. Almost everyone eats twice as much as he needs." But perhaps Dr. Rich would change his two-meal plan in the case of feeble old persons.

Although a healthy digestive system will usually

dispose of an average meal in about four hours, it is not really prepared for another meal in four hours from the time of eating, for, after their energies have been expended and their juices largely exhausted, the digestive organs and glands require time to revive their forces. The time varying from one to three hours. About six hours is a fair average time to allow between meals. Too short an interval between meals is a common cause of dyspepsia.

For old feeble people, an eminent physician, Sir Henry Thompson, advises four meals a day, and suggests that they be taken as follows: Breakfast about 8:30 A. M.; lunch about 1 P. M.; dinner 7 P. M., and a very light supper in one's bedroom about 11 P. M. He says: "All animals feed before retiring to sleep. Few meals are more undesirable than a hearty supper. But elderly men require some easily-digested food to support them during the long fast of the night. It is well known that the forces of the body are at their minimum at 4 or 5 A. M., and this may be well provided for by taking about five or six ounces of consommé with one ounce of brittle toast served in the bedroom."

Cornaro also advocated four meals a day for old people, but said that the total quantity of the four

meals combined should not exceed what was formerly eaten when two meals a day was the plan.

Some persons who have adopted the two-meal-a-day plan make breakfast the omitted meal, while other persons omit the mid-day meal. Which is the better policy would doubtless depend much on the circumstances, but between the supper of one day and the mid-day meal of the next day is a long interval; during the night the stomach would have been emptied, and it would therefore seem wise for a person going out on a cold, stormy morning to have something warming and supporting before starting.

In the case of men who are away from home at their business all day, with perhaps little time to spare for lunch, the mid-day meal would perhaps be the one best omitted.

HOW TO TELL WHEN ONE IS OVER-EATING

Owing to the modern developments of the culinary art, it has become difficult for many persons to distinguish between the artificially acquired tastes or cravings of the palate, and real appetite. And

many persons declare that they cannot tell whether they are over-eating or not.

There are several ways of ascertaining whether one's food is exceeding a healthy limit, viz: (1) By an examination of the urine, (2) by the drowsiness, biliousness, headaches, dyspepsia, etc., that always accompany over-eating, and (3) by an excess of flesh and weight.

THE URINE TEST

The kidneys invariably indicate, by the fluid they pass whether the blood is overloaded with nutritive material. After an excess of eating, the urine usually has a muddy appearance.

If the urine in the morning be found clear and of usual color, it may be inferred that the previous day's food was not excessive. But if it be found cloudy, muddy or red, it would be wise to diminish the quantity or quality of food. Although in the case of old people it should be remembered that there is a naturally turbid state of the urine owing to the chemical dissolution of the body that is going on.—The fat, both of the surface and around the viscera, the marrow, the gelatinous, calcareous portions are progressively more or less absorbed into the circulation, deposited on other parts of the body or gradually evacuated with the urine.—But as there

is a normal state of the urine, which the individual learns by observation, the urine test applies even in old age by showing greater or less deposit than usual.

THE WEIGHT is an obvious and easily-made test of the body's "ballast." At any age, six or seven pounds over one's normal best "fighting weight" should be regarded as undesirable, and when the excess is still greater it should be regarded seriously.

HOW TO AVOID OVER-EATING

Although the evil effects of over-eating are so great, the tendency to over-eat is very general. In fact, so many persons find it a real problem that it is surprising that someone has not written upon how to avoid over-eating. The writer submits the following suggestions, together with the reasons for them:

KEEP THE MIND OCCUPIED, i. e., engage the mind in something interesting, and keep the body active. It is a well-known fact that when the mind is not occupied with business or interesting matters, the animal appetites constantly engage attention; the average idler is always looking to see if it is meal-time, while, on the other hand, the man who is absorbed in business, investigation or recreation often forgets all about eating. Moreover, when mind and body are actively employed the food ingested is more readily absorbed or eliminated than when inactive,—hence a larger quantity can be eaten with less risk.

AVOID DRINKING AT MEALS

By liquifying and softening the food, drinking while eating not only prevents the proper mastication

tion and insalivation of food, but enables large pieces of food to be swallowed without chewing, and is thus a large contributory cause of over-eating and mal-assimilation. Although an apparent contradiction, it is a fact that people who over-eat often suffer from mal-nutrition, the bolted food is often not assimilated.

EAT TWICE A DAY

Two meals a day are certainly sufficient to supply the bodily needs unless one is leading a very active life. Many persons have found that they eat just about the same quantity at each meal, whether they eat two or three meals a day; so, by adopting the two-meal plan, they effected a substantial reduction in the quantity eaten.

By slowly sipping weak tea, coffee or hot water at the time of the omitted meal the writer found that he overcame the desire for food.

EAT SLOWLY and always masticate thoroughly. When food is thoroughly masticated the appetite is appeased with a much smaller quantity than when the food is bolted.

Hence, by eating deliberately, masticating thoroughly and eschewing liquids at meals, the danger of over-eating is very considerably reduced.

THE USE OF SALT AND SUGAR

THE EFFECTS OF SALT ON THE SYSTEM

There has been much controversy regarding the use of common salt as an article of diet. Some writers have claimed that its addition to food is not only unnecessary, but is really injurious to health, that "it has a highly irritating influence upon the tissues; that it is a strong diuretic, detracting from blood and lymph the necessary water for its excretion through the kidneys; that it unduly increases the solubility of albumen, thus excreting in the urine a considerable amount of tissue-building material; that it places a burden upon the alimentary organs, especially the kidneys; that it in time affects the kidneys, promoting nephritis and Bright's disease; that it causes inflammatory swellings of the glands, inducing skin-diseases and scurvy."

Other writers have proclaimed salt to be a veritable elixir of life, and one medical man claims that the drinking, every morning on rising, of a pint of

hot water with a half-teaspoonful of salt in it is a powerful means of prolonging life.

As common salt (chloride of sodium) enters into the composition of most animal and vegetable substances, and especially into the composition of animal food (though it is perhaps largely extracted in the process of cooking) its value in that form is unquestioned. It is an element in human and in all animal blood; and it is claimed that chlorine and sodium, the two elements of which salt is formed, are present in the digestive fluids and are absolutely essential to the digestion of food; chlorine furnishing the acid for the gastric fluid, and sodium furnishing the alkaline properties of the bile. But the wisdom of adding salt to food has long been questioned. It being argued that an inorganic substance cannot be assimilated by the system, that although mineral substances are essential constituents of our system, they can be assimilated and incorporated by us only after they have been transformed in the vegetable kingdom.

Sir Wm. Roberts, M. D., F. R. S., in his "Lectures on Dietetics and Dyspepsia," says: "This habit (of adding salt to food) is probably dependent on the elaborate preparation and cooking to which we subject our food. Animals in a state of nature require none." Arthur W. Duncan, F. C. S., commenting

upon this, says: "There are some rare exceptions where wild animals resort to what are called 'salt-licks,' but it is probable that the herbage they live on grows on land exceptionally poor in soda and potash."

R. T. Brown, M. D., says: "Salt is an antiseptic, and therefore retards the transformation of the tissues. Lean persons of active habits have an instinct for salt, and generally use it freely with their food, while persons of full habit or tendency to corpulency use it sparingly, the transformation being already too slow."

Robt. H. Bradbury, A. M., Ph. D., Lecturer on Chemistry, University of Pennsylvania, says: "There has been some question as to whether salt is a mere flavoring material, like pepper, or is a necessary element in a healthful diet. The facts seem to favor the latter statement. The gastric juice always contains a little hydrochloric acid, and this is formed from the salt of the food. Experiments on dogs have shown that, when the body is deprived of salt for a long time, this hydrochloric acid disappears, and the functions of the stomach are no longer rightly performed. Salt in large quantities is an irritant poison. In one case about half a pound of salt taken at one time caused death."

From such evidence as the writer could gather it

does not appear to be an established fact that the human system is incapable of assimilating salt in its natural or mineral form. Although medical experience with tincture of chloride of iron has shown that there is a decided limit to the beneficial use of such mineral matter, there is reason to believe that some of it is really assimilated; certainly many medical men claim that the tincture has produced beneficial results in anaemic cases. The fact that wild animals resort to salt-licks, no matter how rare the occasions or what the cause, has a tendency to prove by instinct telling them to artificially supply what was lacking, (1) that the addition of salt to food is at least sometimes beneficial. (2) That some of the salt is assimilated, otherwise it would not supply what was lacking in the animals' food; or else, that the salt serves some other and, if instinct is a good guide, useful purpose.

From these considerations, it would seem that whether salt should be added to food, and how much, depends upon the kind of diet, and, perhaps, also upon the bodily condition of the individual. As there is a large proportion of salt in meat or animal food, it does not seem necessary or wise for those who eat, say, twelve ounces of animal food a day, to add salt to their food. Butter and bread usually contain a good deal of salt. But persons who live

largely on vegetables and starchy food probably need an addition of salt because vegetable food no doubt loses a large portion of its natural salt in the process of cooking, especially when the water in which it is boiled is thrown away. And this may explain why some persons lose "tone" when confined to a vegetarian diet.

THE EFFECTS OF SUGAR ON THE SYSTEM

Common sugar, i. e., the kind used generally as an article of diet and called cane sugar, though it is principally derived from beets, requires no process of digestion, other than being dissolved, to fit it for absorption into the blood. An eminent British authority of diet, Dr. Pavy, states that sugar passes so quickly into the urine that it may frequently be detected within five minutes after its injection.

The tendency of sugar is to stimulate the liver and, when taken in quantities, it considerably enlarges the liver. Dr. Pavy's experiments on rabbits and dogs showed that the livers of animals fed on sugary and starchy food were about twice the size of those fed on their ordinary diet. Sugar has a tendency to make those who eat it fat, and Dr. Pavy is of the opinion that the liver is the organ in which the metamorphosis of sugar into fat occurs; although he says, this is difficult to prove.

The London Lancet refers to sugar as "one of the most powerful stimulant foods, adding to one's energy and physical endurance. But it is mostly suitable for those who use muscular energy. Taken in excess it is unfavorable to the digestive process. A strong solution of sugar is irritating to the tissues; it will set up superficial irritation and may produce a form of eczema. It is well known that the excessive use of sugar irritates the mucous membranes of the stomach, and encourages the production of mucous and of a highly acid gastric juice. It also has a decided tendency to spoil the appetite."

Medical men seem to agree that for young people, of from about five to twenty-five years of age, sugar is healthy and necessary; but for older people the wisdom of eating sugar, over and above what is contained naturally in the food, becomes questionable. Persons inclined to be corpulent are advised not to use it. Persons suffering from Bright's disease or kidney troubles are most emphatically and earnestly warned not to take sugar in any form, and should eschew all foods that contain sugar. And it should be carefully noted that all starchy foods are converted, in the process of digestion, almost entirely into sugar. Indeed, if the mastication and insalivation be perfect, they become sugar before they reach the stomach. Hence rice, sago, tapioca, white bread,

potatoes, etc., are all really sugar foods. Jams, marmalades, preserves, and the kind of fruits of which jams, etc., are made, all contain a very large proportion of sugar. In fact, the preserving sugar added to that natural to the fruit makes the average jam contain over eighty per cent of sugar.

FACTS ABOUT TEA, COFFEE AND ALCOHOL

Tea and coffee alike contain a volatile oil, a vegetable alkali and tannic acid. The active principle in each belongs to that family of vegetable alkaloids of which quinine is the representative. Both are stimulant to the nervous system, but harmless when the infusion is not too strong; although it is considered wise to exclude them from the diet of children and of youth of both sexes because of their stimulant action.

Both tea and coffee contain a large amount of astringent matter (tannic acid) which acts unfavorably on the mucous membrane of the stomach and intestines. This, however, is modified to a great extent by the action of milk, which should always be used with these beverages.

When not strong they tend to aid digestion and to hasten the transformation of tissues, as is indi-

cated by the increased volume of carbonic acid exhaled from the lungs in a given time when under their influence.

Strong tea tends to produce nervousness, neuralgia and indigestion.

Coffee is not so astringent as tea, and does not give rise to the nervous symptoms which follow the excessive use of tea. Tea has a greater tendency to induce wakefulness and an irritable state of the system.

Green tea is more injurious than black and also more liable to adulteration.

Cocoa contains a large amount of fat and is much more heating than tea or coffee, and is better fitted for cold weather, especially for persons of spare habit.

THE EFFECTS OF ALCOHOL

Dr. R. T. Brown, Professor of Physiology, Medical Department Indiana University, made the following significant points regarding alcohol: "The direct action of alcohol, and other narcotic poisons, on the nervous system consists chiefly in diminished sensibility and its consequences. If the mouth be filled with a strong alcoholic liquor, such as brandy or whiskey, and the same retained but a few minutes, it will be found that the sense of taste is nearly, if not entirely, destroyed for the time being. The

mucous membrane of the stomach is continuous with that of the mouth; it will therefore be similarly affected by like agents. Alcohol will produce a double effect on digestion; it will render the food less subject to change, and therefore more difficult of digestion; and it will so reduce sensibility in the nerves of the stomach that the imperfectly digested food will be suffered to pass the pyloric orifice into the intestinal canal, and a great portion of the food be lost, if nothing worse occur from the presence of undigested food in the intestines."

"It may be regarded as an axiom in hygiene that the proper development and healthy action of the brain and nerves, in the absence of structural derangements in the other organs, is the prime condition of good health. We should therefore guard the brain from the influence of poisons which impair its powers, disturb its functions or derange its delicate structure." "Of this class of poisons the most dangerous are alcohol, opium and tobacco.

"One effect of alcohol is to thicken the membrane which forms the walls of the air-cells in the lungs, and thus interrupt the easy transmission of oxygen to the blood, and carbonic acid from it." "Thus those who use alcoholic drinks are more liable to become victims of epidemic diseases than those who abstain."

"The habitual use of alcoholic drinks, even though the quantity indulged in does not produce drunkenness will yet leave effects on the brain and nervous system."

Sir Henry Thompson, who was a "moderate drinker" up to fifty-two years of age, says: "It is well known that a popular idea respecting the value of alcohol to elderly men has existed time out of mind, expressed by the quaint saying, 'Wine is the milk of old age.' Desirous of testing this allegation at all events, and I confess with a faint hope that there might be some truth in it for myself, I made an experiment, some five or six years ago, of taking during a period of about two months, a single claret glass, say three ounces, of good wine every day at dinner only. But I was compelled to give it up, as I felt unmistakable signs of the return of pain and stiffness in the joints together with the recurrence of sick-headaches from which I had suffered severely for many years before. For these I had at that early date obtained no relief, notwithstanding much treatment, until I abstained entirely from alcoholic drinks, when after a few months I lost my local pains and the sick-headaches completely. Moreover, the joints gradually lost their stiffness, and ultimately became as supple and mobile as they were in youth."

FACTS ABOUT EXERCISE

The importance of physical exercise can not be too emphatically stated. That there can be no continued healthy action of the organs of the body without physical exercise is a truism that will bear little if any qualification. Every additional day passed without some physical exercise or work will find the limbs, muscles and organs in a weaker state; the muscles more soft and weak, the organs and voluntary muscles more enfeebled and degenerate, and the tissues, mucous membranes and skin with less tone and activity. When a person is sitting or lying down the number of his heart-beats will average only about two-thirds what they would be if walking quietly. When the body is for some time in a recumbent position the amount of blood sent to the various parts of the body greatly decreases and the parts therefore get less nourishment, and, often, the blood barely has enough force and volume to reach the more distant and surface parts fed by the smaller veins and capillaries.

When one is erect the law of gravitation lends its aid to the work of moving the waste matter, but when the body is prone this natural aid to the voluntary muscles is lost. Thus, though less nourished, some of the organs have to do more work. Food and waste matter is delayed in passage through the various channels, tending to clog up and stagnate, and poisoning the blood by the gases of their decomposition. The inactive skin throws its share of the work of elimination upon the kidneys, overtaxing them, and causing disease. The lungs, barely moving, fail to properly oxygenize the blood which creeps slowly along, gathering more and more carbonic acid and losing more and more of its vivifying powers. All the facts of physiology and the teachings of experience show that health can be maintained only by physical exercise.

Inactivity is always followed by loss of strength and vital power, and if continued, inevitably ends in disease and fatal maladies.

The most healthful form of exercise is that which is taken in the open air and sunshine, and combines the advantage of interesting and amusing the mind, and at the same time makes one breathe deeply and exercises all parts of the body. One should take some outdoor exercise every day, whether the weather be good or bad. In these days of raincoats,

rubber boots, etc., one may defy almost the very worst weather.

FATIGUE SHOULD BE AVOIDED

It is very important to note, especially for elderly persons, that excessive exercise or over-exertion is very injurious, and sometimes has grave consequences.

In very active exertion the destruction of tissue is greater than the amount being regularly renewed; in other words, the expenditure is greater than the receipts, hence, in elderly or weak persons whose renewing forces are feeble, exhaustion is apt to be a serious matter.

Violent effort and straining should therefore be carefully avoided and exercise should never be prolonged to the point of exhaustion.

For very elderly persons the exercise should be of the gentlest kind, and taken under the most favorable conditions.

PASSIVE EXERCISE

It is well worth noting that friction and massage of the skin furnishes a sort of passive exercise that is of great value to elderly persons. Dr. Day, writing on this subject, says that "the desiccation and death of the epidermis or scarf-skin, and the thickening of

the cutis can only be prevented by regular ablutions and frictions. The tepid bath followed by hand-rubbing by an attendant is an invaluable remedy." "Friction may be practiced either with the naked hand, with a piece of flannel or with the flesh brush. To be of real service, the process should be continued for at least half an hour every morning and evening, and should be extended not only to the limbs but to the trunk, and especially to the region of the spine, and should be performed by a person properly instructed. In rubbing the abdomen, the course of the hand should accord with the direction of the large intestine. By this simple means we can frequently prevent constipation and relieve the flatulence that is often so distressing in old age." "I was consulted, nine or ten years ago, by a gentleman between sixty and seventy years of age, for disease of the heart. He had resided most of his life on the continent and told me that a French physician had told him to pay special attention to the condition of his skin. He was provided with an instrument very like a currycomb that we use for horses, and he stated that if he chanced to miss being currycombed and rubbed down for a single morning, he always felt the want of his grooming in the course of the day, and was sure to suffer from depression of spirits."

DEEP BREATHING AND FRESH AIR

To breathe properly, easily and sufficiently is absolutely requisite to health, hence clothing should be so arranged as not to compress the chest, the position and carriage of the body should be such as to favor deep breathing.

One should always breathe through the nostrils. It saves strength in walking, modifies excessive perspiration in sleep, prevents the vacant appearance so observable in country people when they come to the city, supplies the lungs more regularly with air, tempers a cold atmosphere in its passage to the lungs through the circuit of the head, and tends by the deeper breathing to the greater development of the breathing organs.

The kind of air we breathe is a powerful factor for good or ill, pure, fresh air exhilarates, revives, refreshes and strengthens us, but vitiated air causes lassitude, depression and weakness.

Dr. Edward Curtis, of Columbia University, says: "Nature's scheme of life is life in the open, where breathing is done in the vast body of the general atmosphere, * * * But when breathing is done in a ten by twelve or even a fifteen by twenty box, in which all openings are closed, the conditions are completely reversed from those of nature. Even by

a single pair of lungs the air in such a box is soon contaminated. Hence in closed places where human beings herd, there come readily symptoms of foul air poisoning." * * * "Therefore, of course, the man that hath eaten of the tree of knowledge maketh it a first care of his rare intelligence that his indoor air shall be just as pure as conditions permit."

Huxley says that in ordinary respiration only about twenty to thirty cubic inches of air pass in and out of the lungs, which he calls tidal air. But every time you slap the backs of your hands together, high over your head, you start one hundred or more cubic inches of air hurrying in and out of your lungs, using and toughening your lung-fibre and all the plumbing from nostril on down to air-cell, and making it harder for pneumonia or other disease to enter.

FACTS ABOUT BATHING

As the skin has two very important functions to perform, viz: (1) To maintain a uniform temperature of the body by increasing or diminishing perspiration according to the heat of the body, and (2) to aid in eliminating waste matter from the body, it is evident that the condition of the skin has an important bearing upon the general health.

Perspiration is not mere water, it contains oily, animal substance and saline matter which, being of a sticky character, tends to clog up the pores; hence in order that the functions of the skin may be properly performed, it is necessary to frequently clear the pores, and this is best done by bathing in warm water, for it is obvious that such substance is more soluble in warm water than in cold.

But, though not the best for cleansing purposes, cold water bathing is a powerful tonic when good judgment is exercised regarding the time, place and circumstances of its use. Only robust persons should stay in cold water more than a few minutes. In summer weather, if the sun has warmed the water, the bathing may of course last longer. But bathing should not be indulged in within two hours after a regular meal, nor when the body is in a very tired or

heated condition, nor immediately after drinking cold water.

Hot salt-water or sea-water baths often prove more beneficial than cold sea-water baths for nervous and weak persons.

Sir Henry Thompson advised elderly persons who take cold baths to have a hip-bath tub filled overnight, and kept in the bedroom to acquire the temperature of the room. And to start the bathing by sluicing the head in this hip-bath while kneeling down, not stooping over it.

He advises an occasional air-bath, exposing the body to the air in the bedroom with the windows open, doing some light exercise meanwhile.

He also says, "there is another mode of taking hot water baths, an exceedingly valuable one. It is the habit of taking a hot foot-bath every night, before going to bed, for about ten or twelve minutes, as hot as it can be borne. I have done this for thirty years. The effect of this on the feet, which should be immersed over the ankles, is to fill their vessels with blood and this affords relief by withdrawing it from the brain. Its tranquilizing effect on the nervous system is remarkable and quiet sleep is promoted, of great value after intellectual activity. Let the highest temperature be maintained for ten minutes."

FACTS REGARDING SLEEP

The amount of sleep a person requires seems to depend upon the nature of his temperament, his occupation and the state of his health. The idea that everyone should take neither more nor less than eight hours' sleep is absurd. Nervous persons, and persons who have worrying and exhausting brain work really need about ten hours' sleep. Indoor-workers need more sleep, generally speaking, than outdoor-workers, because the quality (i. e., the soundness, etc.) of their sleep is much inferior to that of the outdoor-workers and, second, because their nerves are more strained and in greater need of rest.

Nervous persons, brain-workers, and indoor-workers more than any others, require their bedrooms to be ventilated to the very fullest extent possible, pure, fresh air being one of the greatest aids to calm, comfortable sleep, as well as the means of oxygenizing and vivifying the blood. The bed-clothes should be sufficient to keep the body, and especially the feet, comfortably warm. To "keep the feet warm and the head cool" is Dr. Abernethy's advice.

The nervous organs are very sensitive to the

stimuli of light and sound, therefore a bedroom should be chosen that is as far from the noise of the street, etc., as possible, and the room should be darkened during sleep.

We should go to sleep on the right side, so that food may descend by gravity through the outlet of the stomach. After the first sleep the body can of course take care of its own position.

Dr. Sawyer, in his work on Nerves, says that "twenty to thirty drops of the fluid extract of lupuline in a dessertspoonful of the syrup of lettuce is excellent for the sleeplessness of advanced life, and is free from danger."

The bedroom window should hardly ever be closed, day or night, not only to secure fresh air, but to reduce the risk of catching colds, which are so often caught by going from a close stuffy bedroom into the cold outer air.

THE MENTAL FACTOR IN HEALTH

There are many significant facts to confirm the theory that the mental factor is one of the most important to consider in the study of longevity and health, and among these facts are the following:

MENTAL EXERCISE FAVORS LONGEVITY

Of famous brain-workers of ancient times, a very large proportion lived to a good old age. Solon, Democritus, Pindar, Georgias, Zeno, Sophocles, Epimenides, Herodotus, Hippocrates, Isocrates, Xenophon, Cato, and Plato, all lived over four-score years, and among the brain-workers of more recent times we find that Newton, Galileo, Bacon, Kant, Herschel, Hobbes, Locke, Humboldt, Dr. Hahne-mann, Lamartine, Lamark, Laplace, Metternich, Talleyrand, Goethe, Voltaire, Hugo, Buffon, Bancroft, Hallam, Biot, Geo. Buchanan, Spencer, Lord Kelvin, Max Muller, Jefferson, Henry Clay, Earl Grey, J. Q. Adams, Bismark, Gladstone, Palmerston, Longfellow, Tennyson, Wordsworth, Bryant, Whit-

tier, and many others lived long lives. Baron von Humboldt was still writing at ninety. Verdi made some of his finest compositions at eighty-five, Goethe completed Faust when eighty. Arnauld translated Josephus in his eightieth year. Gladstone was still prime minister at eighty-five. Ranke began his history of the world at eighty and completed twelve volumes before he died at ninety-one. Dr. Hahnemann married at eighty, and lived eleven years longer. Guizot was still brilliant at eighty-seven. Von Moltke was still chief of staff at eighty-eight. Walter Savage Landor wrote his Heroic Idylls at eighty-seven. Hobbes published his translation of the Odyssey at eighty-eight. John Wesley was leader of the Methodists at eighty-eight. Michael Angelo was still painting at eighty-nine. Izaak Walton was writing at ninety. Titian painted his Battle of Leipsic at ninety-eight, and Chevreul, the scientist, was brilliantly active at one hundred and three.

Farmers, whose occupation is proverbially healthy, do not appear to live so long as philosophers, statesmen, etc. It is possible that this is due to the farmers not having sufficient mental exercise. However this be, we are justified in inferring the necessity of mental exercise on the ground that, to be healthy, all organs must be exercised, and the

brain is one of the most important organs of the body. Some men who have retired from an active business life seem to fail rapidly if they do not have some hobby or recreation that compels thought and mental activity, and keeps their minds occupied.

THE STATE OF MIND HAS AN INFLUENCE ON THE BLOOD, AND AFFECTS THE PROCESSES OF DIGESTION AND NUTRITION.

Recent investigations indicate:

(1) That when the mind is affected by the emotions of rage and fear, chemical changes of a deleterious, and in fact poisonous, character take place in the blood.

(2) That the condition of the mind affects the bodily secretions; cheeriness increasing their quantity and improving the quality of their flow; depression decreasing and degenerating it.

(3) Emotions of rage and fear, greatly decrease the movements (constricting, relaxing and peristaltic) of the stomach and intestines.

To illustrate these facts: When one is hungry, and appetising foods come within sight and smell, the salivary glands actively secrete saliva, and the gastric juices begin to flow, and the liver, pancreas, etc., become active. The physiological conditions are then very favorable to good digestion.

Yet, if at the time a person is about to eat, something happens that seriously affects the feelings, such as a quarrel, an accident, the receipt of bad news, etc., the blood will be suddenly sent to the brain, leaving the digestive organs weak and powerless. The physiological conditions which a minute previously were very favorable to digestion would then be very unfavorable to it, in fact, food taken under such conditions would be almost poisonous.

A very good proverb, said to be of French origin, is that "a dinner well chatted is half digested," and it is a fact of common experience that a hearty meal eaten in congenial company and under favorable conditions will digest far more easily than a simple meal eaten in gloomy solitude or depressing circumstances.

Quite recently three very old ladies (one being over a hundred years old) residing in different places, were interviewed upon the subject of old age and they expressed substantially the same opinion, namely: that the secret of living to a great age was to eat plain, simple food and to take a lively and cheerful view of life or, as one of the old ladies put it, "to keep in a happy state of mind."

THE ELECTRICITY THEORY

The theory that the electric current has potent remedial properties has been popular almost from the day it was first propounded. And although medical scientists, and others who have investigated the subject, have variously reported the net results as nil, meagre, indifferent or uncertain, the popular belief still persists.

It is an extremely plausible theory; the facts about electricity are so impressive: its furious energy, its incomprehensible speed, its dazzling light, and, in strong currents, its giant force and deadly shock, are well calculated to inspire the notion (so often put in advertisements) that electricity is life. And the fact that the force of the current can be so easily varied makes it seem so reasonable to presume that almost any therapeutic effect desired can be produced.

The most recent phase of this subject is the claim that electricity will rejuvenate and soften the arteries, etc. It is claimed that by means of what

is called the D'Arsonval current and machine a high frequency current of great energy can be applied safely and painlessly to a patient with the remarkable effect of softening arteries that have become hardened by age, arresting the progress of senility and rejuvenating the system generally.

A practitioner in New York claims that this particular current produces tremendous effect upon the arteries of the body, and says that: "The thick lining which makes the arteries hard and brittle seems to be shaken loose by the current, and is carried away and taken care of by the means of elimination. An old man with hard arteries and the consequent dangerously high blood pressure, after fifteen minutes of this alternating current, finds his pressure reduced to what it was perhaps fifteen or twenty years before." . . . "This form of electrical treatment acts as an energizer to the system, equalizes the circulation, restores tone and elasticity to the arteries, improves the general nutrition by establishing a proper relationship between waste and repair, and further helps in the elimination of poisonous products of the system, and stimulation of all the glands of secretion and excretion." . . . "It is found that currents of electricity, which are dangerous or even fatal to human beings when administered at a slow rate of interruption, may be taken through the

body without danger when the rate of interruption is tremendously increased."

In view of the great variety of effects that one sees produced by electricity, the many different currents, the varieties of force, direction, duration, intermittency, frequency of application, place and time of application, and so forth, it would be unwise for one to assert that electricity does not possess the remedial properties that some persons claim for it, but it may be confidently asserted that, in inexperienced hands its use is more apt to be injurious than beneficial.

DIGESTION PROMOTION THEORIES

One of the plausible theories regularly propounded is that anaemia, mal-assimilation and the debility of old age are due principally to deficiency in the quantity or quality of the gastric juices or lack of activity in their secretion; and that by strengthening the powers of digestion by means of pepsin, pancreatin, malt-extract, etc., good health can be secured, and retained indefinitely.

There is reason to believe (certainly many reputable physicians affirm it) that in the cases of invalids and persons suffering from wasting diseases, pre-digested foods, preparations containing pepsin and such like artificial aids to digestion, are of considerable value. Pepsin is an active principle of the gastric juice, obtained from the stomach of the pig immediately after slaughter. Pancreatin is obtained from the pancreas. The activity of these substances has been frequently demonstrated by artificial tests.

For persons with poorly-nourished bodies such

aids are doubtlessly beneficial, but the fact seems to be very frequently overlooked that in most cases digestive debility is not a cause but an effect, and in very many cases it is the effect of over-eating.

It has been proved that the amount of food actually required by the human system is really very much smaller than the amount usually eaten, especially in the case of inactive and feeble persons, and in those past the prime of life. Now if, aided by artificial means, such persons digest more food it would be so much more surplus matter to tax the powers of elimination, or, as Dr. Abernethy said: "kept at the risk of their lives." To incite a person suffering from the effects of over-eating to eat still more is like giving more liquor to a drunkard. It is evident that, in such cases, the remedy is to eat less food, not more. In short, what is needed is something to control the appetite, rather than something to promote it.

Most cases of dyspepsia can be cured by adopting the following simple course: Eat only twice a day; drink nothing with meals; eat only when hungry, and always masticate the food thoroughly.

EXTRACTS FROM A LECTURE BY
SIR JAMES CRICHTON BROWNE,
M. D.

"The fact that what we habitually regard as the infirmities and maladies of old age are not essential to it, you will the more readily realize if you look at them singly and in detail, instead of in groups, as we generally meet with them; for then it will become apparent to you that there is scarcely one of them that is invariably present in old age. As a rule the body becomes bent in old age; but we frequently meet extremely old men of an erect and martial carriage. As a rule, the skin becomes dry and wrinkled in old age, but there are many cases in which it is smooth and soft in octogenarians, even without the assistance of any patent soap. As a rule, the teeth fall out in old age, but instances occur in which they remain sound in their sockets after the average span of life has been exceeded. As a rule, sight and hearing are impaired in old age, but now and then venerable men and women present

themselves in whom these senses retain their pristine acuteness. And, if we turn from the common physiological modifications observed during old age to the pathological manifestations, we perceive even more clearly that they are not of its essence but are accidental accompaniments, attributable not to senile involution but to degenerative influences of various kinds. Senile osteomalacia, senile gangrene, senile gout and rheumatism, senile atheroma, senile softening of the brain, and many other senile morbid conditions, although they occur only in the aged, affect but a very limited proportion of them, arise from causes operative long before old age supervened, and must not be confounded with old age itself."

"It is in the nervous system that the most instructive illustrations of late and long sustained evolutions are to be observed."

"It is the power of reproduction possessed by the cells of the organism as controlled by certain nerve-centers that really determine the duration of life and the character of its decline."

"The natural evolution of the nerve-centers is largely interfered with by our habits of life and methods of work, and retrogression is prematurely induced."

"Depend upon it, the best antiseptic against senile

decay is an active interest in human affairs, and that those keep young longest who love most."

"The atrophic changes which have been enumerated are not altogether beyond remedial treatment. Curable, perhaps, they can scarcely be called, but much can be done by change of climate, by regulation of diet and of habits of life, and by therapeutic agents, to slacken their progress or arrest their advance."

"I must tell you that I think it is a good working hypothesis that the natural duration of the life of man is one hundred years, and that in so far as it falls short of one hundred years it is curtailed of fair proportion." "Perchance, one of these days, we may have an International Congress on Old Age, with an exhibition of dotards for warning, and of hale and hearty centenarians for encouragement. At any rate, you may rest assured that it is by steady obedience to the laws of health that old age may be attained, and by judicious regimen that it may be prolonged."

SOME FACTS AND GENERAL CONCLUSIONS

Although it has been the aim, in this work, to present the respective theories in such form as to leave the estimate of their value to the judgment of the reader, it may not be unwise to direct attention to certain facts and rational deductions.

Life is a complex thing; its continuance depends upon the functional activity of many organs, and upon compliance with many requirements and conditions, not of one only. Life may be terminated by any one of many possible causes. This fact, regarded in its full significance, leaves no justification for expecting robust health or an extension of life to result from the adoption of some one theory or policy of conduct.

However good it may be, so far as it goes, it is almost certain that the net result or beneficial effects derived from the adoption of any one theory will be limited to but one, or to but few, of the many factors involved in the problem of life.

For example, a man may be very careful in regard to diet, and yet so unwise in regard to exercise, cold bathing, exposure, etc., as to over-exert or injure himself or to contract some serious malady. By exposing himself to draughts in public meetings, or by leaving a warm room and following a guest to the street-door, standing on damp ground in thin shoes, etc., etc., he may become a victim to pneumonia, which so often proves fatal to elderly persons.

Again, a person may be very careful in regard to diet and exercise, and may drink buttermilk, and use olive oil, yet, if his mind is morbid or has nothing to interest or exercise it, or if his surroundings are depressing and his associates uncongenial and cheerless, he may go to an early grave.

Again, whatever advantages may ordinarily result from adopting a certain dietary or from pursuing a certain policy they cannot logically be expected to so result in every case; differences in temperament and physiological tendency (e. g., rheumatic, diabetic, anemic, plethoric, etc.) would almost certainly affect its action, and, doubtlessly, in many cases neutralize or restrict its efficacy. For we know that these factors have always to be considered in relation to questions of food, exercise, alcohol, etc.

Moreover, the extent to which other factors have entered in producing the results claimed for some

of the theories or plans advocated cannot be ascertained. For example, it is possible that Cornaro's long life may not really have been due so much to his dietary as to other factors of which he was unconscious. Besides, he might have lived much longer if he had not been a wine-drinker (as alcohol promotes sclerosis) or if he had drank buttermilk, or ate more fruit and vegetables, or used olive oil internally and externally, or had used distilled water, or had taken more judicious exercise, hot baths, etc., or had worn different underwear. All these are powerful factors, but we are unable to estimate the actual extent of their influence.

Cornaro mentions incidentally: "I mount my horse without any assistance or advantage of situation. I climb up hill from bottom to top on foot with the greatest ease and unconcern." "I have frequent opportunities of conversing with many gentlemen valuable for their good sense and manners, their acquaintance with letters, and other good qualities. And when I cannot enjoy their conversation, I betake myself to the reading of some good book." "My house, which I own, is situated in the most beautiful quarter of Padua. It is really convenient and handsome, and so built that, in one part of it, I can shelter myself from extreme heat, and, in the other part, from extreme cold; having

contrived the apartments according to the rules of architecture which teach us what is to be observed in practice. Besides this house, I have my several gardens supplied with purling streams in which I can always find something to do that amuses me."

From these extracts, it is evident that Cornaro (1) took considerable exercise, (2) had the advantage of congenial companionship, (3) kept his mind active by association with intelligent men, and by reading, (4) protected himself from changes of weather, etc, (5) had very pleasant surroundings. We also learn from his own statement that he used to sing; and his grand-daughter, in a letter regarding him, stated that "he preserved his voice so clear and harmonious that, at the end of his life, he sang with as much strength and delight as he did at the age of twenty-five." This one fact is of great importance because some modern specialists maintain that regular vocal exercise is one of the most valuable aids to health. Thus, it appears that other factors besides care in diet contributed to, and combined in, the lengthening of his life. Yet neither he, nor the many writers who have written about his theory, seem to have taken these factors into consideration.

The "mental factors" also vary in the extent of their influence, and are not without their dangers,

—since they may lead to injurious extremes. Absorbing mental occupation and study; conformity for the sake of sociability, etc., etc., often cause the breaking of health rules, and the neglect of physical exercise. And when, for the sake of good company, fun and recreation, one goes to parties or takes a vacation, he incurs whatever risks are involved in the change of food and environment. A change of sleeping place is sometimes very unfavorable to the health of old people; and banquets have proved dangerous even to young persons. At a banquet given at the Wesleyan University, Conn., in 1894, twenty-five of the guests got typhoid fever (which, after a thorough investigation, was conclusively traced to the raw oysters that were served up). Persons have died from eating ham sandwiches at parties, the ham being infected with trichina. Bad water, milk, ice-cream and canned foods have claimed innumerable victims, and even water-cress, lettuce and celery have occasioned fatal maladies, probably owing to their being raised on swampy ground near sewerage, or to disease germs contained in manure.

In short, these considerations, and others that are readily suggested by them, point logically to the conclusion that the best health and the greatest longevity are to be obtained, not by merely drinking

buttermilk or distilled water, or by merely doing some one thing, but by doing a number of things—by complying with a number of requirements. And there can be little doubt that chief among these requirements are: (1) Moderation in diet (2) abundance of fresh air, night and day, (3) sufficient mental and physical exercise to keep mind and body active, (4) plenty of fun, recreation and cheering companionship to enliven the spirits and prevent morbidness and worry, (5) bathing and natural means to keep the eliminating organs—the skin, bowels, and kidneys—active.

Unfortunately, the circumstances and conditions of our lives make it no easy matter to comply with these requirements, even when we have the knowledge and the will-power to do so, but it is reasonably certain that a practical knowledge of the principles of hygiene (including those described in this work) together with will-power and intelligence to make skillful application of such knowledge, will lead to large results in the shape of health, pleasure and additional years of life.



LANE MEDICAL LIBRARY

This book should be returned on or before
the date last stamped below.

AUG 26 1958

10M-12-55-81831

LANE MEDICAL LIBRARY OF
STANFORD UNIVERSITY
300 PASTEUR
PALO ALTO

F85 Bersford, T.
B53 Theories and facts,
1908 for students of long-
evity and health.

DATE DUE

Dr. Cross

AUG 25 1963

F85
B53
1908

